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DECEMBER 19, 1955

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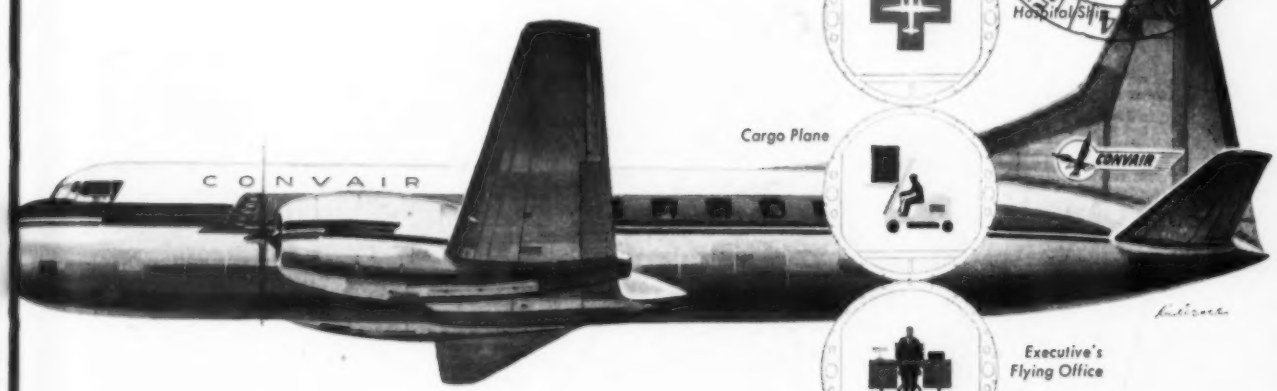


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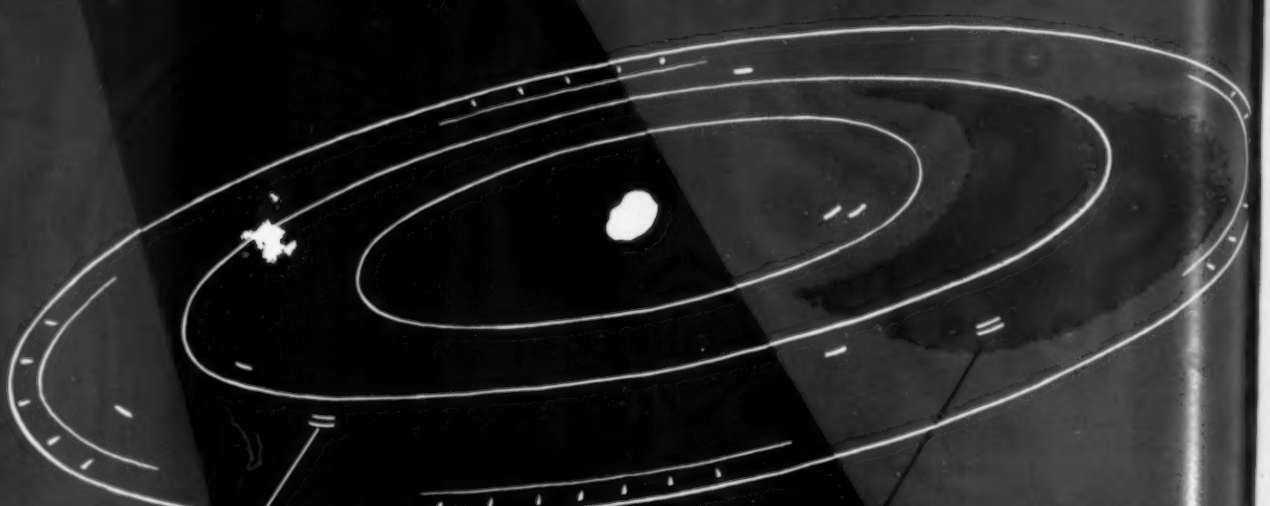

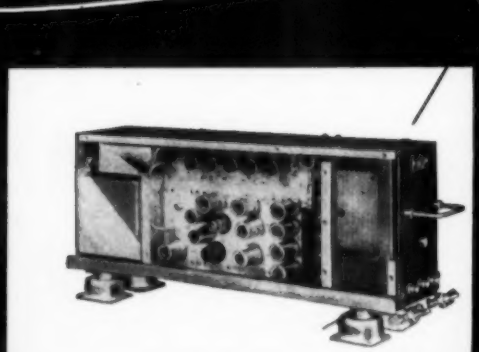

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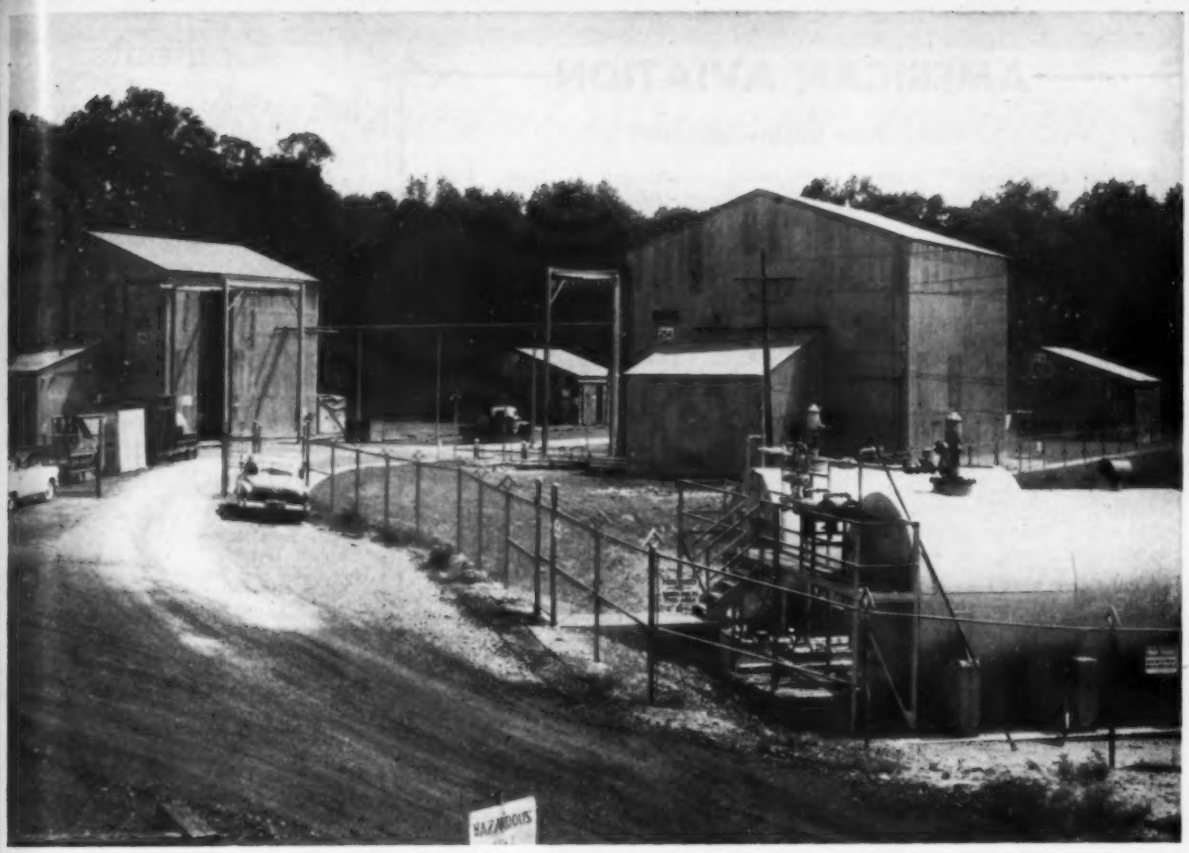


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**New York City:** Administration Building, LaGuardia Airport Station 71, New York, N. Y. Stephen R. Kent, director of advertising; Menard Doswell III, regional advertising manager; Joan G. Payne, sales promotion manager; M. Michael Cerick, regional advertising manager. Phone: Illinois 7-4100.

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# Industry News Digest

## Lowen Takes Over Reins at CAA; Dispute Rages Over Firing of Lee

Following several weeks of bitter dispute, the resignation of CAA Administrator Fred B. Lee was announced last week and Charles J. Lowen, Jr., was named his successor.

Lee's resignation had been requested by the Department of Commerce but he refused to comply until he was so notified by the White House. Lee has contended that he was given no reasons for his firing by either Commerce Secretary Sinclair Weeks or Louis S. Rothschild, Under-Secretary of Commerce for Transportation.

Lowen has been with CAA since May, serving first as a consultant and later as Deputy Administrator. A Denver Republican, he is a pilot and has been in aviation for 17 years. On graduating from the University of Colorado in 1938, he became a partner in Mountain States Aviation, engaged in aircraft distribution and pilot training. He served in the Air Transport Command during the war, retiring as a major.

In 1945, he joined Capital Airlines, first in the post of Assistant Director of Domestic Operations and later Director of Overseas Operations. From 1948 to 1951, he was Director of Aviation for the City and County of Denver. Just prior to coming to Washington, he was Manager of Safety and Excise for the City of Denver.

CHARLES LOWEN

• **Lowen's appointment** has not quieted the tempest, however. Sen. A. S. Mike Monroney (D-Okla.), chairman of the Senate Aviation subcommittee, charged that the "firing" of Lee was "part of a drive by Secretary of Commerce Weeks and Under-Secretary Rothschild to seize control of the nation's aviation as part of their plan to put over a railroad-slanted transportation policy." He promised that an investigation would be held before Christmas and announced intention of drafting legislation to remove CAA from what he called the "political and ground-minded" control of the Commerce Department:

"I believe Lee is being dumped because he supported progressive legislation for air safety and federal aid to city airports. This action is part of a seizure of power over aviation by the ground-minded transportation clique in the Commerce Department."

• **Commerce finally** broke its silence on the Lee matter "to keep the record straight." Rothschild said the decision on Lee was "reluctantly made that someone better suited in leadership talent and teamwork was required" after "long trial and an accumulation of stresses detrimental to the sound development of Civil Aeronautics Administration programs."

Confirming reports of deteriorating relations between Commerce during the past year, he said: "An essential of good management is harmonious relations among top executives. Of course, this does not mean suppression of ideas, for only through frank discussion can sound judgments be formed. But it does mean being able to get along together and, once policy is set, to give it wholehearted support."

He reminded the public that Weeks had been responsible for Lee's appointment more than two years ago and "naturally wanted him to succeed." He also noted that the post of CAA Administrator is "not a civil service career job," but is a presidential appointment "subject to termination at the discretion of the Chief Executive." Republican Lee has protested that he was "a career man," not a politician.

"Administrator Lowen," Rothschild concluded, "has the experience, ability and character to make an outstanding leader in civil aviation progress. He has the confidence and support of the Secretary and myself and the good will and best wishes of the entire department." Lowen's interim appointment is subject to Congressional confirmation.

## Boeing-Wichita Rolls Out First B-52D

First of Air Force's Boeing B-52D eight-jet bombers rolled off the second-source production line at Boeing-Wichita December 7—four months ahead of schedule. The B-52D, like the "C" model being produced at Seattle, grosses more than 400,000 pounds and carries larger drop tanks than early B-52s (A and B versions). Wichita B52s, however, will be strictly bombers, and will not have reconnaissance capabilities of the Seattle-built B-52C. Shown at nose of B-52 (above) is B-47E which was rolled out simultaneously.

## Minetti Succeeds Josh Lee at CAB

President Eisenhower has formally nominated G. Joseph Minetti, currently a member of the Federal Maritime Board, to replace Josh Lee on the Civil Aeronautics Board effective January 1.

Lee, a Democrat, concludes 12 years of service on CAB December 31.

The new Board member is a native of Brooklyn, N. Y. and a member of the law firm of Danahy, Delaney & Minetti. As a recess appointee, he will join CAB on January 1 subject to confirmation by the Senate when it reconvenes.

## Honaman Resigns, New Security Setup Planned

R. Karl Honaman, deputy assistant Defense Secretary-Public Affairs since September 1954 and target of much criticism on Pentagon security policies, has resigned effective December 31 to rejoin Bell Telephone Laboratories.

Almost simultaneous with his departure (although Pentagon officials deny any connection) a new policy on release of information on new military equipment was taking shape.

Although no written directive is planned to outline the policy, vocal orders passed down by the Armed Forces Policy Council reportedly call for no release of information on Defense equipment until one year after it is in operational use.

But whether the new edict encompasses all information or merely *performance* data on new aircraft remains to be clarified. Source of the new ban has been placed in some quarters to a complaint by Air Force Secretary Donald Quarles to Defense Secretary Wilson over public announcement of the 822 mph speed record set recently by the North American F-100C.

In a letter to Wilson in late November, Quarles urged that news about new aircraft types be withheld until after they have been in the active inventory for a year, but he confined his recommendations to performance data.

## CAL Buys 707, Viscount; National Orders Electra; DC-8 for JAL

Airline orders for jet, turboprop and some piston engine transports continued unabated at presstime. Among last minute developments:

• **National Airlines** placed a firm order for Lockheed Electra turboprops, believed to involve 12 aircraft. Braniff, Western and Delta are reportedly close to the signing stage for Electras.

• **Continental Air Lines** ordered all three types of equipment in a program costing about $50 million.

• **Japan Air Lines** ordered four Douglas DC-8s for delivery in 1960.

Continental's three-phase program includes orders for four Boeing 707s at $21.3 million, 12 Vickers Viscount 800s (price unknown) and five Douglas DC-7Bs worth $12.3 million.

The 707s will be J57-powered, seat 118 passengers, and are scheduled for first delivery in May 1959. CAL expects to start service on August 1 and have all four in operation by September 1.

Its 12 Viscounts will be powered by Rolls-Royce RDa7 Dart engines and are due for delivery starting in March 1958. CAL also holds an option for three additional 810s.

The DC-7Bs will be used on the same routes as those to be flown by the 707s. The first will go into service on April 1, 1957. Deliveries will be on the following schedule: one in March, one in April and one in May 1957 and two in August 1957. Continental's DC-7Bs will have C-band radar and will accommodate 64 first-class or 94 coach passengers.

## Crash Won't Delay SeaMaster: Martin

Crash December 7 of the Navy's Martin XP6M prototype jet attack seaplane is expected to cause little delay in the SeaMaster test program, Martin officials say.

A second SeaMaster is now out of the hangar undergoing engine tests and is expected to fly sometime in January.

Meanwhile, wreckage of the plane is being recovered from Chesapeake Bay for assembly at Patuxent Naval Air Station in an effort to determine the cause of the mishap.

## Henzey, Bramley Win Writing Awards

Two members of AMERICAN AVIATION's editorial staff were named this month as winners of Trans World Airlines 18th annual aviation writing competition.

Transport editor William V. Henzey was chosen author of the best business and financial story in the aviation trade and technical publications category, and was also named sweepstakes winner in that class.

Vice president Eric Bramley was judged writer of the best airline sales and promotion story.

## 'Aerodyne' Airliner — 1975 Vintage?

**This artist's concept of a possible "Aerodyne" airliner of the year 1975 was unveiled recently by Dr. A. M. Lippisch, a former top aeronautical designer with Messerschmidt. Lippisch, who now heads Collins Radio Co.'s Aeronautical Research Laboratory, described the wingless Aerodyne to the Washington, D. C. section of the Institute of the Aeronautical Sciences as a flying body, lifted and propelled by an internal lift-inducing propulsion system. He disclosed that Collins, under contract to the Office of Naval Research air branch, has obtained "several practical solutions" to the design problems of this new aircraft type.**

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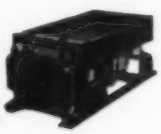

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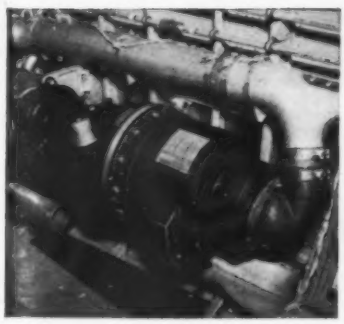

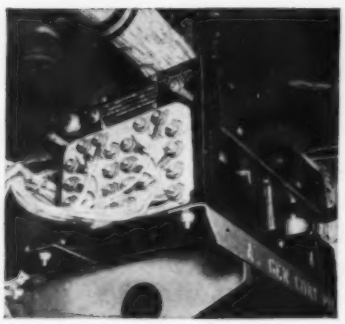

These photos taken on the F-102A production line at the Convair Div. of General Dynamics Corp. show the three Jack & Heintz a-c system components in process of installation. The generator (left) mounted with a Sundstrand constant-speed drive is located in the aft fuselage. The control panel (center) and voltage regulator (right) are mounted in the ship's nose.

* * *

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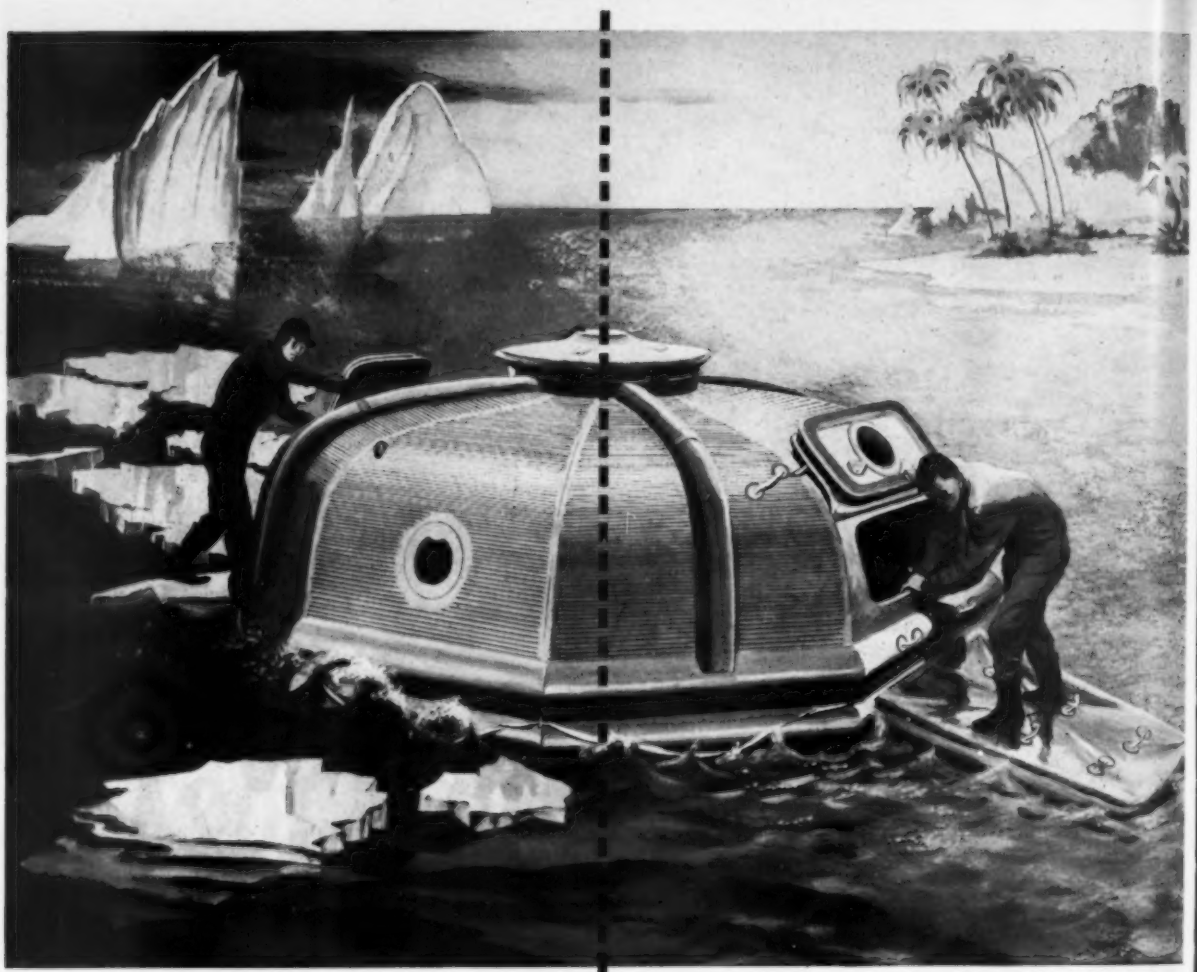

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# Personal View

By WAYNE W. PARRISH

## The Next Five Years: Tougher Tests in Store

Any fast-moving, rapidly-increasing business which started from scratch as a pioneering enterprise must inevitably transform from a pioneering enterprise into a full-fledged, mature business corporation. The transition is often painful.

The two largest segments of the dynamic aviation industry—manufacturing and airline operations—have had to face the tests of management maturity and growth at different times.

World War II put every aircraft manufacturing concern under enormous management strain, but the tests are less severe in time of expansion than on the downhill run. The inevitable shakeouts came immediately after the war when business volume dropped sharply. Despite the protective cloak of national defense orders, the fact remains that the airplane building industry has been largely stabilized for some time.

The scheduled airlines, on the other hand, were constricted during World War II. The first tests of strain came during the postwar expansion period in which, despite the plush protection of subsidy and a constant growth curve, more than one major management was reshuffled.

But the next five years will bring tougher tests of management than any period heretofore. Not only is the protective cloak of subsidy gone, but the highly competitive turboprop and turbojet era of a few years hence, combined with more and more multiple-route services (as per the recently-announced route decisions) will most likely level off more than one growth curve.

Management mistakes, management indecision, and failure to develop well-rounded organizations, can often be covered up by a growth curve as sharp and as constant as the airline business has enjoyed for ten years. But now that $3 billion will be needed in new capital financing for the next ten years and competitive problems will multiply, managements will be put to much greater tests than ever before.

How many airline managements have transformed from pioneering one-man enterprises into fully-staffed, mature business institutions? How many are prepared for the tougher competitive days now on the way? How many top executives are backstopped by younger men in training to take their places? How many companies are developing junior executives into well-rounded management team members? The answers would be quite varied. And quite a few would be discouraging.

A few good signs can be seen. We were impressed recently by American Airlines' plan of sending 240 staff members to Cornell University for three-week courses of business management. The nine-month program is sound planning.

Two years ago American started on a reorganization with emphasis on "planning for profit." This entailed the delegation of additional responsibilities and authority to more people in the company. With the increased responsibility being placed on the shoulders of these people, it became evident that they would benefit from intense training in techniques of business administration.

After looking about the country for suitable institutions, American chose Cornell, at Ithaca, N. Y., where the airline men study and live on the campus. Each three-week course consists of approximately 25 men, drawn from all departments.

Prime objective is to stimulate thinking along new lines and to enable those men who attend to exchange experiences with their associates. The payoff will be in future months and years as programs are developed within the company to supplement the Cornell course. Thus American is setting out to perfect a strong management team which will not rise or fall because of a single man or a small group.

United Air Lines has been sending top-echelon personnel to Harvard Business School for some time with a similar objective. But not every airline is preparing for the tougher times to come. Not every top executive has chosen a "line of succession" so that key men are backstopped by others in training. Not every airline is getting the stimulus of new ideas it needs to have, or developing junior executives with business administration training. The tests for survival in the coming decade will be tough for those who don't heed the warnings.

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# Letters

## Rusty Horseshoes

The painstaking job by CAB safety investigators in reconstructing the remains of the sabotaged DC-6B near Denver early in November was most impressive. They collected fragments of the plane out of sugar beet fields, from an area five miles long and two miles wide. They reassembled the fragments and from the buildup determined the source of the explosion. In searching in the beet fields, they probably also came across old horseshoes and rusty tractor wheels, but these they of course rejected as extraneous and irrelevent.

One wonders whether such painstaking procedures might not be adopted by the CAB in economic fields. Is it too much to hope that in reaching economic decisions the Board can toss out all the evidentiary horseshoes and political wheels and fit the remaining relevant facts into fully consistent and completely logical patterns?

FREDERIC P. KIMBALL
Aviation Consultant
Westport, Conn.

## Liked Fireye Story . . .

To Editor:

We were most gratified to see your article on the Fireye Rocket Fire Detector in the October 10 issue.

It has been very well received here and I have been asked to order 1,000 reprints of this article for distribution by our organization.

GERALD LAUDERDALE
Electronics Corporation of America
Cambridge, Mass.

## Outdated Report . . .

To the Editor:

My attention has been invited to the quotation from a Hoover Commission staff report which appears on page 29 of the October 10 issue of your publication. The staff report referred to Fiat's satisfactory performance of the F-86K program, but erroneously spoke of an alleged "growing prevalence of communist elements in labor unions at the Fiat plants."

In the latter respect the staff report was badly outdated when it was released by the Hoover Commission, and is even more out of date now.

Shop steward elections were held in Fiat's new aeronautical unit in December 1954, the free unions getting 1,820 votes (95.9%) of the 1,897 valid ballots cast. Only 77 votes (4.1%) were for the candidates of FIOM, the union in Fiat affiliated with the General Confederation of Labor (CGIL), the leadership of which came under communist domination after World War II.

Shop steward elections were held in the rest of Fiat's plants at Torino in March 1955. Out of about 49,600 valid votes cast, the free unions received 62.1% and CGIL-FIOM only 37.9%, a direct and dramatic reversal of the results of the preceding year when CGIL-FIOM polled 62.5%. In terms of all workers eligible to vote, the CGIL-FIOM percentage was even lower—33.4%—and workers who failed to vote can hardly be said to be under the

Piasecki H-21 Work Horse helicopters are playing an indispensable part in building and servicing early-warning Arctic radar and communication stations.

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ENGINEERS NEEDED: *Send resume to Employment Representative*

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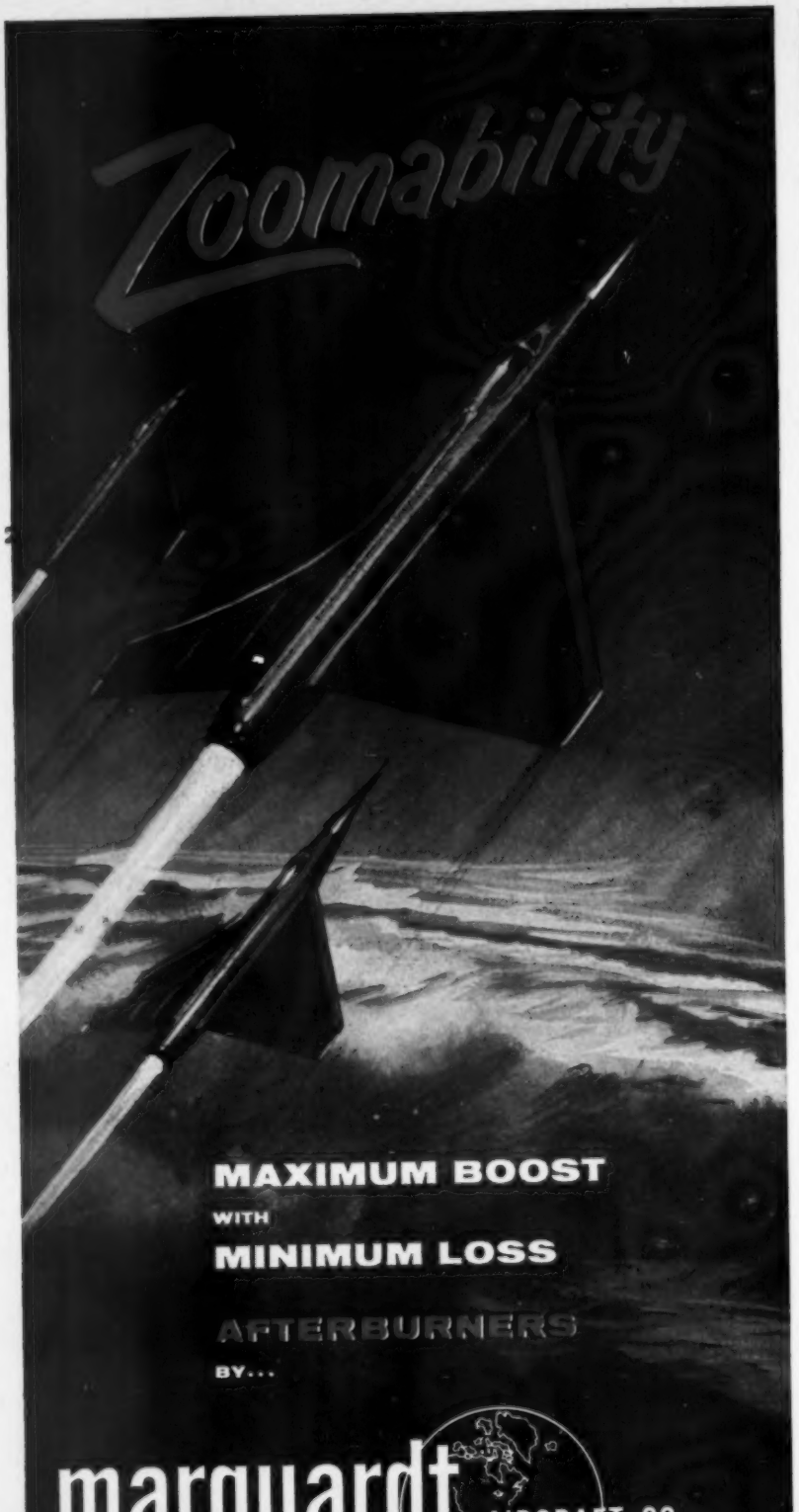
Circle No. 5 on Reader Service Card




# Letters

discipline of the communist-dominated union. The results of this 1955 election received widespread and favorable publicity in the United States. For example, the story in the New York Times for March 30, 1955, was headlined "Fiat Workers Hand Reds Sharp Defeat; Italian Union Vote Ends Long Control."

It should be added that the same anti-communist trend has been demonstrated in shop steward elections throughout Italian industries.

These facts about Italy should be known in the United States, in the interest of promoting the friendly, vigorous and effective cooperation between these two allies in strengthening themselves and each other against communist threat.

GABRIELE PARESCE
Press Counselor
Italian Embassy
Washington, D. C.

## *IDEAS Wanted . . .*

To the Editor:

As a regular subscriber and avid reader of your fine magazine allow me a comment on your criticism. Specifically, I refer to the baggage delivery problem from plane to passenger. Since I have been reading your magazine (over two years) I have frequently seen snide and caustic remarks about this problem; yet there have been but two ideas (Commando Baggage Team and the Airdock) printed approaching a possible solution.

As a station agent for one of the major trunk carriers (United) I am often the recipient of barbed comments from passengers. I cannot help that there was other cargo (sometimes as high as 4000 pounds) to be loaded and unloaded with three other fellows in the short span of ten minutes. In addition, the ramp help also works the functions of passenger agent, load planner, air cargo agent and lead agent. The problems of operational functions intensify many fold at flight time and the requirements of attaining a smooth and efficient operation demand a high mentality and very even disposition of all agents. In inclement weather these problems are compounded by snow and ice both on the plane and the ground equipment.

Consider also, an incorrect through count of passengers or load dispatch manifest errors that may require readjustment or relocation of cargo (even removal) and you have a vague idea of what agents at a large intermediate station are up against. We are too small to get a Commando Baggage or an Airdock. We work with mechanically good equipment, but the design of that equipment is from an age when man discovered the wheel and not the age of the airplane.

Most station agents have ambition and intellect. We accept a relatively low pay and irregular hours because of our faith in commercial aviation and individual potential. We also accept beratements (real or imagined) to an unusual degree many of which we cannot do a thing about (i.e., weather delays, mechanical delays). You can say that these people are not "thinking" individuals; yet you may not say it—to



Circle No. 7 on Reader Service Card.

# Letters

them. However, in the bag delivery department we are sensitive. Please remember we are not magically endowed with three hands when a plane lands.

May I point out that from your October 24 Engineering and Development Issue under the "Equipment Engineers Report" there was not one mention of advancement in ground equipment pertaining to the specifically mentioned problem? Yet you quote "Virtually no area of aeronautical engineering escapes the problems of high speed flight." "Virtually" was undoubtedly the correct adverb to use in that quotation. I wonder how many of the contributors in that article made oral comments, wrote letters or griped to fellow passengers about baggage delivery? Surely this is an integral part of high-speed flight.

So please, don't malign the poor station agent about bag delivery. He IS doing his best under far from desirable circumstances. Instead, give us support by publishing IDEAS about ground handling of commercial liners. Destructive comment just irritates but criticism associated with adaptable ideas stimulates progress.

Thank you.

(Name withheld on request)

*P.S. Thank you also for an excellent publication!*

*Editor's Note—Amen!*

## Where's Western?

To the Editor:

The good reporting done by AMERICAN AVIATION throughout the years is certainly worthy of commendation. I read this periodical from cover to cover and depend on it for keeping me abreast of the latest in aviation circles.

One article in particular I have been waiting to read for some months, and in your November 21 issue, this article, entitled "Five Trunklines Win New Routes in CAB Denver Service Decision" gained my immediate attention. You can imagine my letdown when only four trunklines were mentioned and not a word on Western Air Lines, the fifth trunkline to win a new route from Denver to San Francisco/Oakland via Salt Lake City and Reno, Nevada.

We, in the Twin Cities of Minneapolis and St. Paul, feel that this new route is a very important addition to our area, giving as it does, the only one carrier service between this growing metropolitan area and the Bay area. There is no question that Denver, Salt Lake City, Reno, San Francisco and Oakland also feel that this new service via Western Air Lines nicely complements existing schedules.

While, no doubt, this omission was unintentional, it was so obvious that I am compelled to bring it to your attention.

HARRY L. WHITE
St. Paul Sales Manager
Western Air Lines
St. Paul 2, Minn.

*(Editor's note: We're blushing. The omission was inadvertent, and as our friend at St. Paul has pointed out, this is a very important new route for Western.)*

High altitude combat missions, mine laying, reconnaissance . . . are all in the day's work for the Douglas A3D . . . part of the Navy's strong right arm. Here's an airplane which, with the P&WA J-57 engine, packs the power and versatility the Navy needs!

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## new Boeing jet tanker to stretch America's Air Arm with mid-air refueling

Almost daily, continuous flights halfway around the World are being made because huge KC-97 tankers meet bombers for refueling in mid-air. Tankers like the Boeing KC-135 will bring "targets" on faraway Continents within striking distance. The new Boeing KC-135 will haul extra large cargoes because *added strength* with *less weight* is possible with metal honeycomb construction. Kawneer is helping build more planes like the KC-135 *faster* because of excellent metal bonding facilities to produce any kind of honeycomb assembly. Our experience in metal bonding honeycomb will be helpful to you in designing new applications of this material. This is another example of how you can benefit by Kawneer's integrated engineering and manufacturing service.

**Kawneer will produce the ailerons for the KC-135 utilizing honeycomb sandwich construction**

**Illustrated here is the Boeing 707 Tanker-Transport prototype of the new KC-135.**




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# When & Where

Jan. 9-10—National Symposium on Reliability and Quality Control in Electronics sponsored by Institute of Radio Engineers, Statler Hotel, Washington, D. C.

Jan. 12—Transportation Outlook Conference, Hotel Statler and U.S. Chamber of Commerce, Washington, D. C.

Jan. 12—Conference on Airport Financing, University of California, Berkeley, Calif.

Jan. 9-13—Society of Automotive Engineers annual meeting, The Sheraton-Cadillac and Hotel Statler, Detroit.

Jan. 19-21—National Simulation Conference sponsored by Dallas-Fort Worth Chapter of Institute of Radio Engineers Group on Electronic Computers, Baker Hotel and Republic National Bank Bldg., Dallas, Texas.

Jan. 23-26—Plant Maintenance and Engineering Conference and Show, Convention Hall, Philadelphia.

Jan. 23-26—Institute of Aeronautical Sciences 24th annual meeting and Honors Night Dinner, Sheraton-Astor Hotel, New York.

Feb. 2-3—National Symposium on Microwave Techniques, sponsored by Institute of Radio Engineers' Antennas and Propagation Group, and Theory and Techniques Group, Philadelphia.

Feb. 7-9—Eleventh annual conference Reinforced Plastics division of Society of Plastics Industry, Hotel Chalfonte, Atlantic City.

Feb. 9-11—Eighth Annual Southwestern IRE Conference and Electronics Show, Municipal Auditorium, Oklahoma City.

Feb. 16-17—IRE-AIEE-University of Pennsylvania Conference on Transistor Circuits, Philadelphia.

Mar. 19-21—Society of Automotive Engineers, National Production meeting and forum, Hotel Statler, Cleveland.

Mar. 19-22—Institute of Radio Engineers National Convention and Radio Engineering Show, Waldorf-Astoria Hotel and Kingsbridge Armory and Palace, New York.

April 9-12—Society of Automotive Engineers, National aeronautic meeting, aeronautic production forum and aircraft engineering display, Hotel Statler, New York.

Apr. 22-26—Twenty-ninth convention American Association of Airport Executives, Hotel Carter, Cleveland.

May 1-3—Electronic Components Symposium, sponsored by IRE, AIEE, RETMA, WCEMA, NBS, Departments of Defense and Commerce, Department of Interior Auditorium, Washington, D. C.

May 2—Fourteenth annual conference Society of Aeronautical Weight Engineers, Ft. Worth.

June 3-8—Summer meeting Society of Automotive Engineers, Hotel Chalfonte, Atlantic City.

June 17-21—Semiannual meeting American Society of Mechanical Engineers, Hotel Statler, Cleveland.

June 19—Tenth session of International Civil Aviation Organization Assembly, Caracas, Venezuela.

# Honor Roll

*A Quarter Century in Aviation*

★**Curtis Barkes**, United Air Lines. Vice president—finance and property, Chicago. (30 yrs.)

The following men have each completed 30 years with the Boeing Airplane Co.:

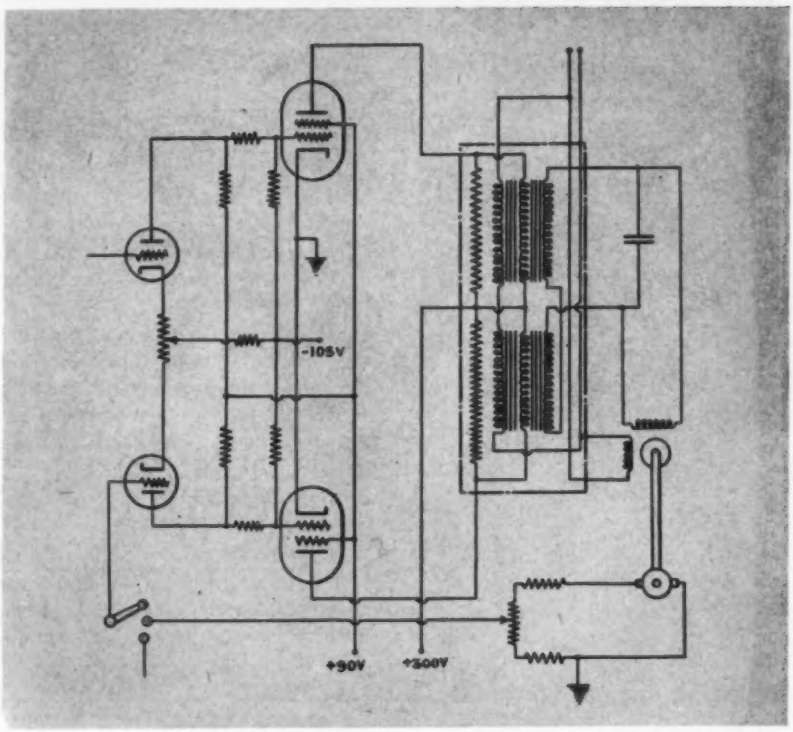
**Delos E. Anderson, Harry T. Christensen, Theodore J. Droppelman, Sr., Walter B. Higgins, Alman W. Hopkins, Leslie W. Linderoth, Earl C. Moulton, Carl Olander, Jr., John C. Sanders, Joseph Severa, Richard K. Sundberg,** and **Donald I. Wilbur.**

**William M. Allen,** Boeing Airplane Co. President, Seattle, Wash.

**Russell T. Lund,** Western Air Lines. Captain, Los Angeles, Calif.

**Bert B. Castellano,** Western Air Lines. Dispatcher, Los Angeles, Calif.


SINCE 1915 LEADERS IN AUTOMATIC CONTROL




# Servo Motor Control System

Most engineering ingenuity concentrates not on basic principles, which are relatively simple, but on the fine details that make the difference between good and poor design, between high and low cost, or between efficient and inefficient component arrangement. For instance, the motor control system patented by the Ford Instrument Company. The purpose of the system is to provide a sensitive control system to make an induction motor respond accurately to a relatively small reversible input signal. This system employs saturable-core transformers to combine the sensitivity of vacuum tube amplifiers with the high power-carrying capacity of saturated-core devices. This also facilitates the problem of matching the motor impedance with that of the amplifier.

In the circuit shown the first pair of tubes act as a phase inverter, with the control signal applied to the grid of one inverter tube. The feedback signal, produced by a d-c generator coupled to the controlled motor, is applied to the inverter tube. The output of the inverter is the signal of the servo loop. The second pair of tubes acts as a driver-stage for the saturated transformers that supply one winding of the controlled two-phase induction motor; the other motor winding is connected to the power line.

This is typical of the things Ford engineers do . . . every day. If you have a control problem it will pay you to talk to the Ford Instrument engineers.

83

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# AIRTRENDS

Washington, D. C., Dec. 19, 1955

THE HOT COMPETITION over who will supply propellers for this country's turboprop transports is fast resolving itself into a matter of who will stay in the propeller business.

*General Motors' Aeroproducts Operations*, which won the first Lockheed Electra order (from American), this week was expected to solidify its position with a similar contract from Eastern Air Lines.

*Curtiss-Wright*, a contender in the AA and EAL deals, now holds the only major military contract—for the Lockheed C-130—but faces the prospect of Air Force approval of a competitive G-M prop on this model too.

*What began as a commercial competition* is becoming "no-contest" with G-M in the driver's seat. Some reports place the Aeroproducts bid as much as 20% below the nearest competition, and its warrantees twice as long.

*And indications are that if Curtiss-Wright* doesn't hold the C-130, it might have to stop producing turboprops. The same signs once emanated from Aeroproducts—before the Electra business came along.

QUALITY OF U.S. PRODUCTION MILITARY AIRCRAFT has reached a level where Air Force is expected to expand its policy of flight testing only a limited number of planes prior to acceptance.

*Aircraft now being accepted* on the sample system (AF flight tests of one out of every three, or one out of five) include the Northrop F-89D, North American F-86K and F-100C and the Lockheed T-33. The system also is being applied to planes overhauled by Hayes Aircraft, Birmingham, Ala. (the NAA B-25 and Fairchild C-119).

KEY TO EARLY ACTIVITY on a completely automatic air traffic control system lies in Commerce Department's handling of its Fiscal 1957 budget request, its acceptance by Budget Bureau, and the nod of approval by Congress.

*Budget Bureau's Harding Committee* has been told that such a system could be placed in operation in six years if between $200 million and $300 million are made available for research and development during fiscal 1957-58. Explanation is that all the various electronic elements such as radar and TV are available, but a concentrated R&D program to tie them into a network is mandatory.

*Plan then would permit installations* during the following four years at costs running over $1 billion. If adopted, it would give U.S. a modern ATC system almost coincident with start of high-speed jet operation.

PENTAGON BUDGETEERS ARE QUIETLY DISCOUNTING efforts of military mobilization officials to set up a new reserve machine tool stockpiling program. "They had $200 million to spend and they barely touched it," says one comptroller. "To us, that means they don't really need it."

DON'T LOOK FOR ANOTHER "unallocated reduction" in the defense budget for 1957. The Pentagon budget makers got burned in their guess this year's spending would fall $1.75 billion below the service totals; they now figure their budget is "too tight" to allow room for such a reduction.

SHOWN IS COCKPIT OF MARTIN B-57

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When the pilot completes his cockpit check list and engages the starter, the B-57 is off the runway in the fastest time possible . . . because Olin Starter Cartridges supply instant, reliable starting energy at the flick of a switch. With split seconds often the difference between success or failure in an aircraft's tactical mission, designers and engineers now increasingly look to solid propellants as the easy-to-carry, easy-to-use answer to eliminating cumbersome ground accessory equipment.

Olin Explosives Division experts have already helped crack many a tough jet-age nut. The fact that their unmatched knowledge and know-how is automatically placed at the disposal of a manufacturer is one important reason Martin and many others are calling on Olin in an increasing number of problems. It may be that creative utilization of solid propellants and explosives offers the best and fastest answer to some of your own present problems. A call to Olin will soon have you talking to men who can provide you with technical assistance.

Olin Solid Propellants and Explosives Are Ready For Use In The Following Applications:

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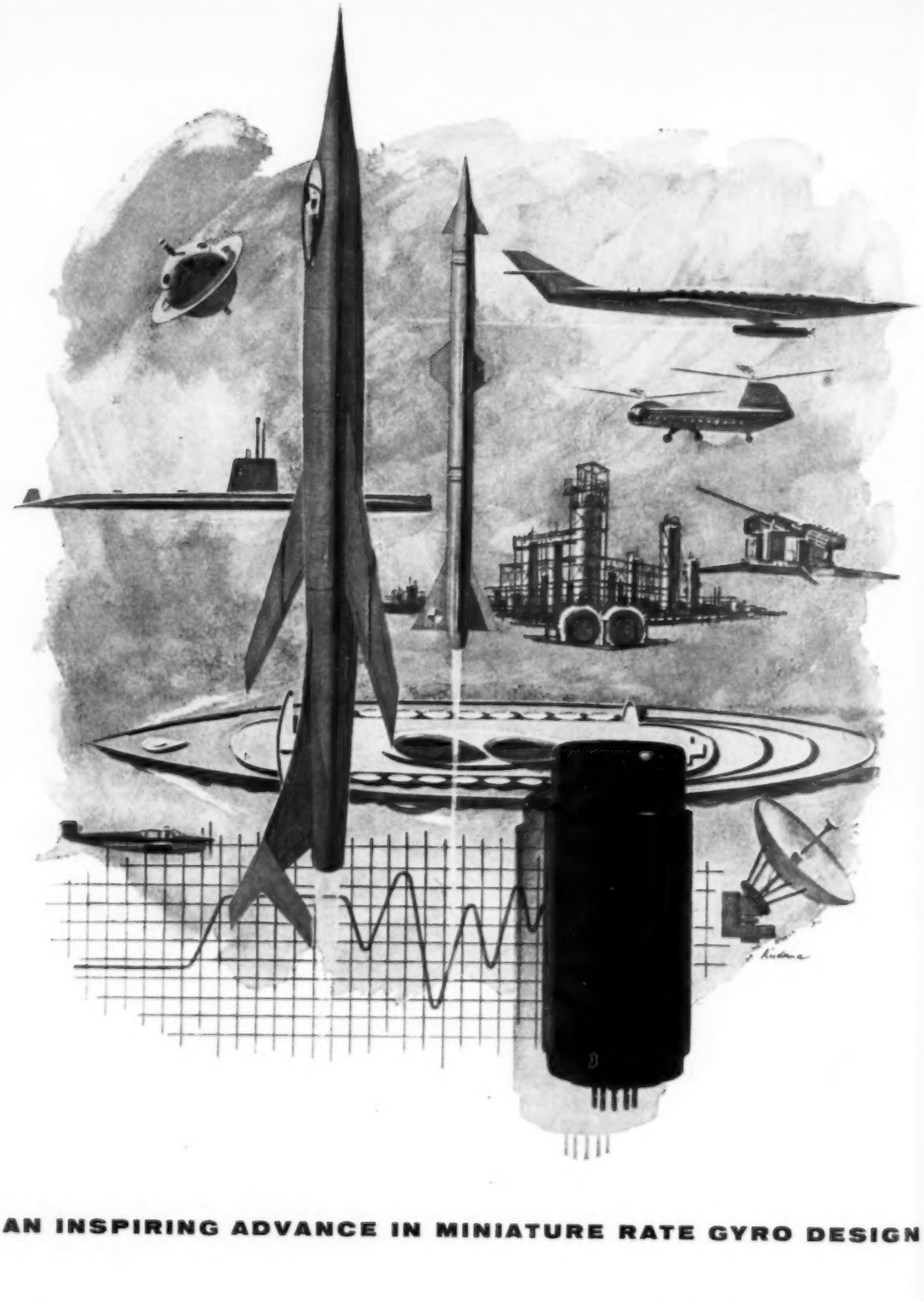

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**Rugged and Durable**—Designed with partially floated gimbal for a guaranteed life of 1000 hours minimum, meets all applicable military specifications.

*For complete engineering data write Lear, Inc., Grand Rapids Division, Grand Rapids, Michigan.*

**LEAR**

# Production Spotlight

• A jet-powered version of the Beech Aircraft T-34A Mentor is expected to be test flown before year's end at Wichita. Powerplant is a Turbomeca Marbore II. New Version will be offered as a primary jet trainer.

**• A major manufacturer of inertial guidance equipment for aircraft says effectiveness of electronic jamming techniques demonstrated in recent Exercise Sagebrush has triggered a flood of inquiries about progress in inertial systems. Inertial systems are "passive" and do not require nor emit electronic signals for navigation information. The SAGE system is understood to emit signals only periodically for guidance information correction.**

• Latest version of the Northrop Scorpion, the F-89H, has been flying since September. Basic difference from the F-89D is its ability to launch Hughes Falcon air-to-air missiles.

**• Air Force officials are showing increased interest in Chance Vought's F8U Navy day fighter and the company is working up a USAF version. AF's big problem: Where to get funds to buy the plane.**

• Watch for official announcement soon of Navy's newest drone, the Beech KDB-1.

**• USAF has placed an order for a TF-104 trainer version of the Lockheed F-104. Planes will probably be delivered for use by the Air Defense Command rather than the Air Training Command. Lockheed has still not sold its proposed reconnaissance model, the RF-104.**

• Lockheed-Marietta holds only a $500,000 Phase 1 (R&D) contract for a supersonic jet tanker but is using some of its own money to make the Pratt and Whitney J75-powered plane convertible to a cargo-transport as well. The plane is Lockheed's hope for the next round of commercial jet transports to succeed the Boeing 707 and Douglas DC-8.

**• USAF support for Avro-Canada's "flying saucer" is much less than one published figure of $100 million. Accurate estimate of the AF's contribution is about $8-10 million. To date, USAF's contract with Avro involves no prototype, only paper studies and some hardware.**

• Army and Air Force will both develop their own versions of the medium-range (1,500-mile) guided missile recently approved by the Joint Chiefs of Staff. Decision for parallel development was made by Defense Secretary Wilson.

**• No orders have yet been placed by the Air Force for the Navy's Martin P6M Seamaster flying boat. USAF nevertheless still considers the Martin plane a promising strategic bomber.**

• High-level Pentagon thinking on vertical take-off fighters now seems to be that the Navy's turboprop XFY-1 and XFV-1 and the AF's jet-powered Ryan delta are too far ahead of the times. Powerplants are unsatisfactory for the job involved. Emphasis in the interim will probably be placed on STOL (short takeoff and landing) aircraft.

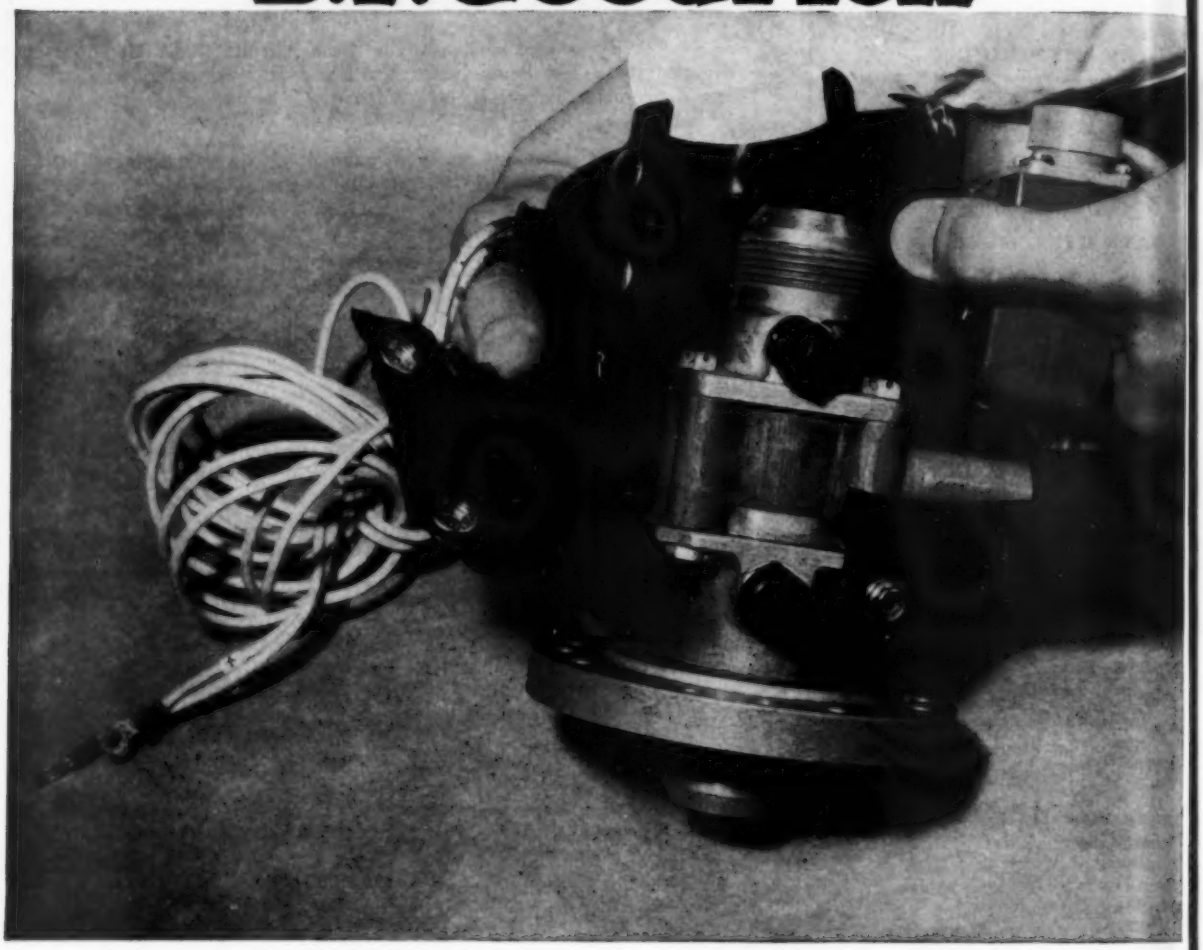
**• A five-cylinder sleeve-valve-type engine for use on small helicopters, flying platforms and low-speed target drones has been developed by Vard, Inc.**

• Republic is still watching the SNCASE Caravelle with interest but, despite some rumors being circulated, is still far from acquiring the license. The French jet transport is attracting considerable interest in Europe following Air France's order for it.

**• The commercial version of the Pratt & Whitney J75 will probably develop about 14,000 lbs. thrust. Indications are that it will be available late in 1959.**

• The SNCASO Djinn helicopter's gross weight has been increased to 1,800 lbs. from the original 1,320 lbs.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



# Heated girdle gives oil valve a life-saving hug

PROTECTING this oil valve from cold is just as important as protecting a plane's wings from ice. The valve *must* operate freely in low temperatures to maintain the vital flow of lubricating oil. The problem was to apply the right amount of heat without adding excessive weight. And despite the complication of the oil valve's irregular shape.

B. F. Goodrich engineers felt they had an answer in BFG electrically heated rubber. Its core of resistance wires can supply heat of any specified density. It's both lightweight and flexible.

They developed this one-piece, snap-on "girdle" of heated rubber that fits skin-tight around the tricky curves and corners of the oil valve. It provides the needed amount of heat evenly, automatically. When the engines call for oil from the main oil cells, the valve operates quickly and effectively.

B. F. Goodrich electrically heated rubber also solves the temperature control problem in the main oil cells with specially built blankets that keep oil at free-flowing viscosity. And wherever oil lines are jeopardized by cold, B. F. Goodrich heated rubber jackets keep them warm.

BFG electrically heated rubber is the most efficient method of putting the right amount of heat on the right spot. It provides temperature control or anti-icing protection for any size or shape of airplane part. Supplies heat constantly or in cycles, depending on the problem. Can be used inside or out.

It's used on wings, hydraulic lines, propellor blades, water tanks, spinner domes, jet engine intakes, pitot masts, radar equipment. If these applications suggest a better solution to your heat problem, call on B. F. Goodrich engineering and research facilities for expert help. *The B. F. Goodrich Company, Tire and Equipment Division, Aeronautical Sales, Akron, Ohio.*

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Circle No. 12 on Reader Service Card.

ESTABLISHED JUNE 1, 1937

World's Largest Aviation Publishers
American Aviation

VOL. 19, NO. 15

# Hot Battles Loom Over Aviation Issues As Congressmen Map 1956 Strategy

- **Defense spending will run afoul of tax-cutting, budget-balancing pressures.**
- **Politics of presidential election year could upset all calculations.**

By FRANCIS J. KEENAN

AVIATION will be a more central concern of the second session of the 84th Congress than ever before.

While little else can be predicted accurately on the eve of an assuredly hectic election-year session, these principal issues have already emerged:

• **Defense spending,** with emphasis on the relative strength of U.S. and Soviet air power, will be more bitterly fought over than in the previous session.

• **The budget** with tax levels already producing an estimated revenue surplus, will be the target of a budget-balancing vs. tax-cutting battle. Scrambling these two dominant issues will be politics—a 1956 Presidential variety which is expected to be unique in intensity and complexity.

## Line-up of Forces

At this pre-session vantage point, a preview of coming conflicts shows contending forces lined up this way:

• **Democrats,** charging inadequate Administration defense preparations in the face of rapidly advancing Soviet technology and production, will try again to speed up U.S. production of advanced air weapons.

• **Republicans,** supporting an anticipated Administration defense budget pegged at slightly more than current ($34.5 billion) spending levels, will argue that American military capacity is at record peacetime highs and is growing sufficiently.

• **Tax cuts** for lower income groups —regardless of budget conditions—will be pushed by a Democratic majority, in lieu of reductions in other areas or pleas for a balanced budget.

Republicans, torn between the political appeal of tax cuts and Administration efforts to balance the budget, will concentrate first on checking expenditures; then will tend to emphasize the balanced budget or spread savings over a wider personal-corporate tax area.

• **Foreign aid,** including direct military assistance and off-shore procurement, is shaping up as a hotter-than-ever battleground—with one side deeply concerned at increased Soviet efforts toward economic and military penetration of Near and Middle Eastern hot spots, and the other side publicly committed to end foreign aid programs altogether.

Underlying these broad policy struggles—and often qualifying them considerably—will be these more limited efforts:

• **Sen. Hubert Humphrey's** (D-Minn.) special committee on disarmament is already at work on a realistic survey of relative U.S.-USSR military forces—the results of which could significantly affect decisions on defense spending.

• **Three Congressional subcommittees** (Rep. F. Edward Hebert's Armed Services Investigations subcommittee, Rep. George Mahon's Defense Appropriations subcommittee and Sen. Lyndon Johnson's Preparedness Investigating subcommittee) will soon reveal, possibly in public hearings, the progress quietly made during the past several months in studying the "reasonableness" of aircraft manufacturer's profits.

• **Extension of the Renegotiation Act** may provoke a major fight: opposed by industry and influential Congressmen as inequitable and self-defeating, and supported by the Administration as an important tool in controlling defense expenditures and as a revenue-producing measure.

• **Rapid tax amortization**—blamed by Treasury Secretary Humphrey for large revenue losses—will once more be at issue in considering Defense Production Act extension.

Civil air transportation, though not the compelling issue that military aviation is, can expect to find itself embroiled in the general Congressional concern with the budget:

• **Appropriations committees,** viewing their own lower estimates of airline subsidy requirements as more accurate than CAB figures for fiscal 1956, will be encouraged to chop even more vigorously.

• With huge new money requests

Chavez

Mahon

Monroney

Magnuson

**Key men in aviation in Congress. Top left to right: Sen. Dennis Chavez (N.M.), chairman of Senate Defense Appropriations subcommittee which will consider $35-billion-plus defense budget, and Rep. George Mahon (Tex.), who plays similar role in House. Bottom, left to right: Sen. A. S. Mike Monroney, chairman of Aviation subcommittee, and Sen. Warren Magnuson, Commerce Committee Chairman.**

for civil airways and navigation facilities on tap, and as little Executive agreement and as much confusion over rival systems as ever, frustrated Congressmen might do anything. They may even go for Sen. Bridges' Senate-passed proposal for a joint Congressional investigation.

• Transportation excise taxes, due for comprehensive Congressional study, will run headlong into reluctance to reduce any Federal revenues that won't bring sizable political returns. House-approved legislation exempting travel to Central America, Mexico, the Caribbean area and Canada stands best chance of squeezing through.

### Politics Holds Key

Politics of the second session could upset all calculations. The greater the uncertainty about Presidential candidates in 1956, the less controlled and more fractured will be Congressional activity.

Difficult to handle at best, Congressional talents for individualistic activity will be multiplied, especially in the Senate. There, with so many members already mentioned as Presidential or Vice Presidential possibilities and many more occupying key positions in the nominating process, political influences will be constantly at work.

Voting blocs and alliances will be harder to build, more difficult to hold in line, for both Republicans and Democrats. More than is usually so, every legislative item, every strategy move, will be considered with one eye on the immediate political effects. Indecision, postponement of controversial matters, legislative stalemates—these conditions thrive in an uncontrolled, undirected Congress.

One issue, highly vulnerable to political maneuvering, may be the omnibus aviation legislation now pending before the House and Senate Commerce Committees. Though both chairmen have promised action this next session, the issues involved have lately become more controversial than ever with publication of CAB's regulations setting up the new "Supplemental" air carrier category.

Congressional developments will hinge on these questions:

• How satisfied are non-scheduled interests—including the politically potent North American combine—with the CAB's action.

• How much pressure will the certificated industry bring on Congress to review both the wisdom of the Board's regulations and their legality under the Civil Aeronautics Act.

The question, however, is tailor-made for Congress to adopt its "let's wait and see how it works out in practice" policy.

### More Likely Possibilities

Other matters, pending and prospective, offer better possibilities of Congressional action during the second session:

• Permanent certification of States-Alaskan air carriers—high on Sen. Warren Magnuson's priority list.

• Some kind of retaliation for Pentagon ineptness in handling Congressional "free" transportation—probably involving Defense Department use of MATS aircraft for high-ranking officials.

• House and Senate Small Business Committees interest in Federal regulatory agencies, including the CAB.

• Senate hassles over confirmation of two new CAB members and one CAA Administrator.

• A second Washington National Airport—on which a Commerce Department report has been demanded by Sen. Magnuson for the first day of the new session.

• Renewed opposition to the Post Office Department's air transportation of first-class mail—touched off possibly by an Appeals Court decision on the department's "experimental" program.

• The Administration's already-announced plan to seek increased postal rates.

• Prototype transport aircraft development legislation—passed by the Senate—now before the House Commerce Committee where it may be stymied (a) by jet transport advances announced this year, or (b) by continued failure to appropriate implementing funds.

• Past controversies over ARDC Headquarters location and design of Air Academy may be resolved in new budget.

• ROTC flight training bill, approved by the House, is due for affirmative action by the Senate, especially in face of continued difficulties in attracting flight candidates from AFROTC programs.

• A final report from the Senate Preparedness Investigating group on the Navy's troubles with the Westinghouse J40, as experienced with the F3H Demon and programmed for other aircraft.

• Early attention to legislation providing death penalties for malicious destruction of aircraft.

Not so certain to develop Congressional activity, but worth keeping an eye on, are these possibilities:

• Revived interest in House Majority Leader McCormack's (D-Mass.) blast at AF contracts with AT&T for construction of the SAGE early warning radar system—a possibility with all sorts of delicate ramifications, especially in light of recent SAGEBRUSH experience.

• Investigation by the Hebert Armed Services subcommittee into Naval Reserve difficulties with the Grumman F9F-7 Cougar.

• Renewed attention to continued Pentagon security policies by the House Government Information subcommittee.

• Railroad attempts to drive transport policy revisions hurtful to competitors.

• Sen. George Smathers' (D-Fla.) probe of international air route agreements, while apparently dead, could come to life again.

## Cutlasses on Hurricane Patrol

These Chance Vought F7U-3 Navy fighters were among a formation of Cutlasses from Atlantic City NAS used recently for hurricane and flood damage survey patrol duty on the East Coast. F7U-3s, each powered by a pair of Westinghouse J46 turbojets, are rated in the 700 mph class.

***WHAT THE ARMY WANTS:***

# Heavier, Handier Planes-Plus Bigger Air Role

By HENRY T. SIMMONS

The Army is hammering out new doctrines for linking ground power with aerial mobility. The objective: Heavier, faster and handier aircraft than anything now in the Army inventory, plus a much greater aviation role for the soldiers.

Interim aircraft needs shaping up at the Army Aviation Center in Washington call for:

• **High-speed jet observation aircraft** to adjust fire of Army missiles and long-range atomic artillery.

• **Close-support aircraft for** attack of tactical ground targets.

• **Troop-carrier aircraft** for movement of men and equipment within combat zones and for the creation and maintenance of airheads within enemy territory.

Whether the Army will be successful in fulfilling these requirements is another matter. They clash all along the line with missions now performed by the Air Force, and specifically with the limitation on the weight of Army fixed wing aircraft imposed by the famous "Memorandum of Understanding" of 1952. Unless these barriers are removed, the soldiers will be stopped short in their campaign for more aviation.

Army L-23 Beech Twin-Bonanza for staff and courier work.

Army's largest airlift plane, the U-1A de Havilland Otter.

### Army Planners Confident

But top planners at the Army Aviation Center are confident they'll get at least some of the things they want. They argue that organic aviation is the answer to their need for greater mobility, and they believe they can convince the reigning powers of the Department of Defense on this point.

"If you want any big increase in mobility today, it seems to us you want a vehicle that can travel independently of rice paddy, jungle and mountain," explains Brig. Gen. Carl I. Hutton, commanding general of AAC. "In short, you have to get off the ground."

• **Does this mean** the Army wants to set up a new air force all its own? Gen. Hutton supplies this answer: "If it is meant does the Army think it has a right to use aircraft on its own missions, the answer is obviously yes. But if it is meant does the Army want to interfere with the U.S. Air Force, the answer **is no."**

This answer won't be of much comfort to the Air Force. The steady growth in the stature and autonomy of Army aviation activities, both in the field and on the Army staff, has been a source of apprehension to the men in blue for some years.

The seed of the present Army Aviation Center, for example, was the old Air Training Department at the Army Artillery Center, Fort Sill, Okla. In January, 1953, it was designated the Army Aviation School, and in September, 1954, the school was transferred to Camp Rucker. Last February, the school was re-designated the Army Aviation Center, and just two months ago, Camp Rucker was named Fort Rucker, indicating its change to a permanent Army installation.

But AAC officials insist that the separation of Army aviation activities from other functions is recognition of the interests of all branches of the Army in aviation, rather the narrow interest of Army aviation in itself. They point out that the fixed wing and helicopter pilot training programs they are conducting are designed to meet the specific needs of seven Army branches: Infantry, Armor, Artillery, Engineers, Signal Corps, Medical Corps and Army Transportation Corps.

Though the Center's principal mission is training pilots and mechanics for Army aircraft, an important sideline is the development of new combat techniques making maximum use of the air. A look at the Army's ultimate aviation objectives is important to an understanding of the Army's aircraft requirements during the next few years.

### Radical New Vehicles Seen

• **Army tacticians** envisage the development of a radical new family of fighting aircraft vehicles for the conduct of *ground-to-ground* combat operations. Such a force would include light, high-speed reconnaissance vehicles, fast air striking forces, and aerial fighting units with enough firepower for destruction of the enemy on the ground.

Instead of merely transporting men and their equipment to the point of battle, and carrying out air attacks at the direction of the ground fighting force, the vehicles themselves would constitute the fighting machines, in the same sense that light and heavy tanks, gun carriers and other wheeled and tracked vehicles

L-20 de Havilland Beaver used for dropping supplies.

make up the present-day armored column.

A fighting division with total aerial capability could dominate a circle 50 miles in radius deep in enemy territory. Theoretically the organization of such divisions could multiply the effectiveness of the Army's present strength as much as ten times and assure the continued existence of a U.S. force-in-being adequate to cope with any peripheral war.

What would such a force look like? AAC planners don't know, but they speculate that bold adaptations of presently available techniques rather than major technological breakthroughs will be sufficient to design the family of "ultimate" tactical vehicles. Such techniques include the ducted fan, used in the Hiller flying platform, convertiplane techniques, boundary layer control, diflected airstreams and the like.

• **The family** of ultimate tactical air vehicles is a long-range proposition, of course. The Army aviation planners can't say for sure when they would become available. The period of 1975-80 has been suggested—far-fetched though that may sound. But of this the planners are certain: the new vehicles can't possibly be developed, much less acquired or used, within the confines of the Memorandum of Understanding.

While allowing the Army to develop helicopters and convertiplanes without size limitations the agreement sets a ceiling of 5,000 pounds on the empty weight of all Army fixed wing aircraft. Moreover, it specifically reserves to the Air Force the missions of "close combat support, assault transport and other troop-carrier airlift, aerial photography, tactical reconnaissance and interdiction of enemy land power and communications."

• **A formal Army request** is expected soon for a revision of the Memorandum. It's doubtful the soldiers will get as much freedom as they want, but chances look good for a revision favorable to the Army on the weight limitation, at least. In this connection, Air Force Secretary Donald Quarles has said he is willing to consider the Army's request for a revision of the 1952 agreement.

Assuming the Army is allowed greater scope in its aviation activities, it may be expected to push development of short takeoff and landing (STOL) fixed wing aircraft of substantially greater payload capacity than its present aircraft.

### 'Dirty Aircraft' Wanted

"What we want is a simple, dirty aircraft of limited range and speed, but capable of taking off and landing on short, unprepared fields," explains one ACC tactician. "It should have good fuel economy, and it should be capable of rapid loading and unloading. Frankly, we like the Chase C-122, and we also like the looks of the old Ford Tri-Motor."

For its series of interim STOL aircraft, the army men are thinking of fixed wing planes with a carrying capacity ranging from 5,000 to 16,000 pounds—the latter figure sufficient to accommodate one of the Army's latest weapons, a tracked 90 mm gun carrier. If altogether new aircraft are to be developed, the planners think turboprop engines hold the most promise.

The soldiers, incidentally, aren't happy with the Fairchild C-123 which the Air Force is providing for assault transport use. They admit they are partly to blame because they did not make their exact requirements known. But they feel the C-123, while its 16,000-pound load capacity is admirable, has sacrificed short field characteristics for speed and range. They complain it needs a 1,500-foot strip in which to operate and that this is too luxurious for their combat needs.

If the expected revision of the Memorandum permits, the soldiers will also explore the use of jet reconnais-

Sikorsky H-19s (S-55) replace ground transportation for moving artillery.

This is Lago do Moreno in Argentina. On the far shore a Swisslike village.

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## What's In A Name? "Plenty!" Says Army Aviation General Hutton

"If the Army needs a jet observer aircraft to detect targets for missiles and to observe their point of fall, we should call the aircraft what it is—an aerial observation post. If we call it a reconnaissance airplane, someone will get out the functions papers and say that reconnaissance belongs to the Air Force.

"An aircraft to attack ground targets may be a requirement. The Air Force calls this close support, and claims it as a function. The title itself blocks progress. We should call it perhaps a primary weapon, or an integrated weapon. The latter term seems preferable.

"Airborne operations bring up the subject of a Troop Carrier Command—another jealously guarded function. If we need a flying machine for incorporation in the ground scheme of battle, we should give it an appropriate name, such as organic air transport."

*Brig. Gen. Carl I. Hutton,, Commanding General, Army Aviation Center, in Nov. 1, 1955, "Army Aviation Digest."*

sance and close-support aircraft, possibly of an STOL character. Ultimately, they would like all their fixed wing aircraft to have the ability for either a vertical takeoff or a running takeoff, but they realize the development of such machines will be a long time in materializing. So for the interim period of Army development, the accent will be on STOL. ◆ ◆ ◆

# Air Force Needs $350 Million Plus For Research & Development-Gardner

By ROBERT M. LOEBELSON

The Air Force can use, and must have, between $350 million and $400 million more than current and expected appropriations to finance needed research and development.

In an exclusive interview with American Aviation, Trevor Gardner, Assistant AF Secretary for R&D, declared the additional funds are needed to take care of promising projects which cannot possibly be covered with money appropriated by Congress for the current fiscal year and for fiscal 1957.

Included, Gardner hinted, are monies for research on a second intercontinental ballistic missile (to support Convair's Atlas) and to foster development of newer non-air-breathing engines.

• **During last year's** budget hearings, the Assistant AF Secretary said, he had prepared for Congress a list of areas in the R&D field in which the Air Force is deficient and could use additional appropriations. The second ICBM, and new approaches to the powerplant problem are two of those areas.

Gardner explained that as warplanes fly higher and faster, the air-breathing turbojet engine that we know today becomes highly inefficient. For that reason, he indicated, new concepts (probably including turbojet-ramjet and turbojet-rocket combinations) are under consideration.

• **"There is no doubt,"** he said, "that we will be flying at Mach 2 and Mach 3 at 100,000 feet before too long. The pure turbojet won't do the job."

Gardner explained that he had proposed an additional $100 million to $200 million as a supplemental appropriation for the current (1956) fiscal year but had been rebuffed by Defense Secretary Charles E. Wilson and the then Assistant Defense Secretary for R&D, Donald Quarles.

"Present signs indicate," he added, "that we will be short by about the same amount in fiscal 1957, and I plan to try to get a supplemental from Congress either during the budget hearings or after the 1957 defense money bill is passed."

• **Gardner indicated** the 1957 USAF budget would show a sizable increase in R&D over the $570 million appropriated for 1956. "Actually, it's misleading," he said. "The 1957 R&D appropriations include money previously placed in the maintenance and operations category so it looks bigger. For all practical purposes, we will have no more for true research than we have had all along."

The AF official took issue with allegations made in the past that the Air Force cannot possibly spend more than $1 billion a year for research activities. "R&D money isn't used only for brainpower," he pointed out. The appropriation covers operations at 11 air bases (including the Arnold Engineering Development Center at Tullahoma, Tenn., and the missile proving ground at Banana River, Fla.) the flying of 885 different aircraft, and about 42,000 personnel in R&D (most of them in the Air Research and Development Command), Gardner declared.

He said he was still hopeful that some of the money he considers lacking for the current fiscal year will be made available through a sort of slush fund controlled by the Defense Department.

## Turbo-Transporter Makes Debut

Piasecki Helicopter Corp.'s turbine-powered YH-16A has attained a speed of 166 mph, about 10 mph faster than the helicopter record held by a Sikorsky XH-39 (S-59). The YH-16A Turbo-Transporter will carry 40 troops and a crew of three. It is powered by two Allison T-38 turboprop engines. Production models, to be called YH-16B, will be powered by two Allison T-56s and will carry 54 troops.

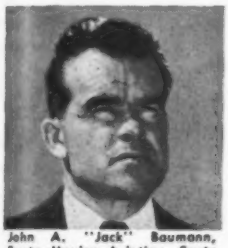
Gene Hudman, Stonnell and Holladay Aircraft Sales, Caroline Division, Municipal Airport, Charlotte, North Carolina.

Herrol Bellomy, L. B. Smith Aircraft Corp., Miami International Airport, Miami, Florida.

Peter Graves, Southern Ohio Aviation Sales Co., Dayton Municipal Airport, Vandalia, Ohio.

H. Leibee Wheeler, Buffalo Aeronautical Corporation, Buffalo Municipal Airport, Buffalo, New York.

Charles H. E. Westerman, British Colonial Airlines, Calle Lopez No. 1 — Despacho 502 Mexico, (1) D.F., Mexico.



John A. "Jack" Baumann, Santa Monica Aviation, Santa Monica Airport, Santa Monica, California.

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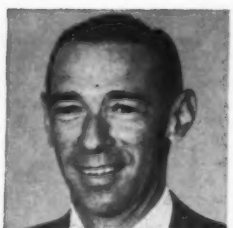
B. G. Vandre, Van's Air Service, Municipal Airport, St. Cloud, Minnesota.

Don Vest, Vest Aircraft & Finance Co., P. O. Box 5306, Sky Ranch Airport, Denver, Colorado.

Lucien M. Taillac, Trans-Aire Corporation, Pan-Air Building, New Orleans Airport, New Orleans, Louisiana.

H. Warren Holladay, Stonnell and Holladay, 843 Washington Building, Arlington Towers, Arlington, Virginia.

Robert F. Wood, Newport Air Park, Newport, Rhode Island.



Louis Humphreville, Executive Aircraft Corporation, Municipal Airport, Pontiac, Michigan.

Art Maurer, Arthur Maurer Co., Inc., LaGuardia Field, New York, N. Y.

Max R. Brand, Aero Commander Dist. (Downtown Airpark), Hangar 3, Municipal Airport, Tulsa, Oklahoma.

O. S. Callan, National Aero Sales Corp., Midway Airport, Chicago, Ill.

John Wilsdon, Executive Flying Corporation, P.O. Box 122, Lambert Field, St. Louis, Missouri.

A. M. "Sime" Bertolet, Reading Aviation Service, Inc., Municipal Airport, Reading, Pennsylvania.

W. H. "Bill" Buchanan, Sales Manager, Johnsons Air Interests, Inc., Horlick-Racine Airport, Racine, Wisconsin.

L. S. McIntire, Aero-Tex Corporation, 3300 Love Field Drive, Dallas, Texas.

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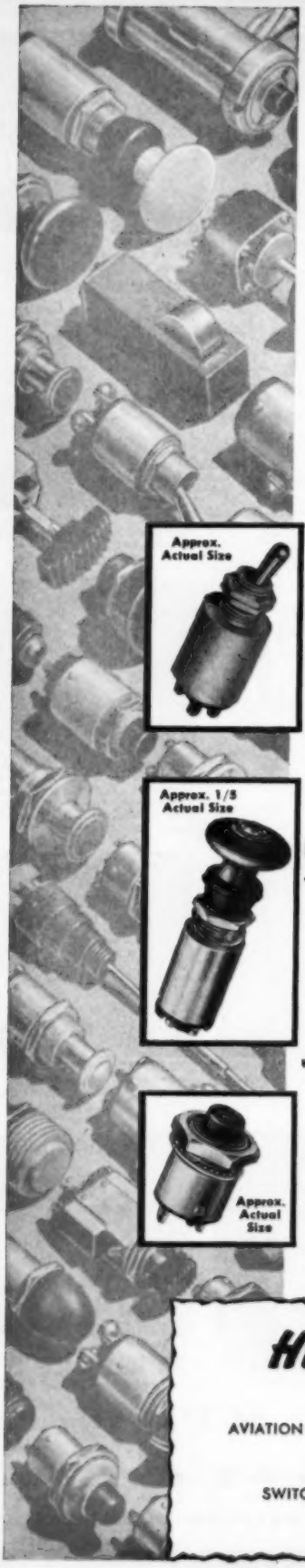

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Small size, light weight, and added dependability go hand-in-hand in all Hetherington switches. For the lightning-fast Hetherington snap-action mechanism permits higher ratings in less space ... without deceptive "clicks" or "snaps" ... and with no danger of teasing the switch ON or OFF contact.

Shown below are just a few of the many Hetherington snap-action switch designs in the 5 to 50 ampere range.

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**MINIATURE TOGGLE SWITCH** *type T2104*

Only $1\frac{19}{64}$" long by $\frac{15}{32}$" in diameter, this new Hetherington design takes considerably less space than comparable rectangular switches. The T2104 uses a positive cam-roller snap-action that "feels" and performs like a toggle switch should. 4-terminal arrangement "makes" contact between separate pairs of terminals in each position—can be connected for SP-DT action. Conservatively rated for 50,000 cycles at resistive loads of 10 amps, 28 volts dc; 5 amps, 115 volts ac.

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**HOLDING COIL SWITCH**

*... the answer to many control problems*

This "control engineer's delight" combines relay, switch, and pilot light functions in a single unit only $1\frac{5}{16}$" in diameter by $3\frac{3}{8}$" long. A built-in solenoid holds the switch on contact until solenoid circuit is externally interrupted. SP-ST switch circuit may also be broken manually by pulling the switch knob. Knobs may have built-in lights to indicate when the holding circuit is energized.

Approx. Actual Size

**"JR" SERIES Push-Button—Momentary Contact**

*Over 600 Types*

These unusually rugged and dependable snap-action switches have become almost a "standard" for critical aviation and industrial applications. Six circuit arrangements and over 20 mounting adapters match virtually any requirement. Rated for inductive loads of 17 amps, 24v dc; 15 amps, 115v ac; or 7.5 amps, 230v ac. U.L. Approved for ac. Similar switches for MIL-6743 (MS-25089) applications available as Type W100.

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"My job isn't too simple, however. All I have to do is convince Mr. Quarles (who left the Defense R&D post to become AF Secretary) that he was wrong in opposing my request when he was in Defense. In addition, I've got to sell his successor (Dr. Clifford C. Furnas) on the need for the extra money."

• **Gardner alleged the USAF had** lost valuable time on several projects in the past because some R&D individuals had been reticent about spending money. "They would order two prototypes instead of three, or three instead of five. Then, if the two prototypes crashed or otherwise weren't able to operate, time was lost until they could be replaced."

The Assistant Air Secretary said he had been unable to convince other Pentagon officials of the urgency of supporting additional research and development activities.

"It seems to me that when you're faced with a need or edict to cut down on spending, you invest your money on future projects. That means more R&D as I see it. But so far, it's been a lonely fight." ◆◆◆

## Fred Davis to Direct ATC Enforcement Unit

Fred Davis, often referred to as CAB's "sixth member," has been named Director of the Air Traffic Conference's newly-created Enforcement Office.

Executive assistant to CAB Member Chan Gurney since 1951, and assistant to two previous Board members—Clarence Young and Harold A. Jones—Davis will assume his new post on January 1. He joined CAB 11 years ago as an attorney in the General Counsel's Office.

## Glenn Martin Dies

Glenn L. Martin, 69, one of the great pioneers of aviation, died December 4. He was buried in Santa Ana, Calif.

Although he had largely relinquished active management of the Glenn L. Martin Company, which he founded in 1917, he remained keenly interested in aviation and was working on secret armament developments and an invention in the field of explosives at the time of his death.

Mr. Martin built one of the first aircraft factories in the U.S. in 1909, made the first over-water flight in America in 1912 (between Catalina Island and Newport Harbor, Calif.) and won the Collier Trophy for 1932 for his outstanding achievements in aeronautics. Before he became a leading manufacturer, he was regarded as one of the nation's leading fliers.

# which do you want?

Money or the moon?

It was reaching for the moon which resulted in the development at Martin of one of the most dynamic engineering team operations in the whole new world of flight systems development.

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In south-east Arabia, vital oil well drilling equipment has been transported by air from the coast to the operational site in the barren desert. The direct surface route was impassable, the alternative being twelve hundred and fifty miles of slow transport by sea and then by specially designed vehicles over rough desert.

Single items of equipment weighing as much as 16½ tons, some of 9 feet in diameter and others over 40 feet long have been delivered by a Blackburn "Universal" air freighter. Each load was flown to the oil drilling site in under two hours.

These large, indivisible loads could be carried by no other aircraft using the landing grounds available. These were roughly graded, unsurfaced desert strips.

THE *Universal*

*Blackburn and General Aircraft Limited. Brough, E. Yorks, England*



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# WADC Tests Supersonic Bailout Capsule

**Advanced equipment may make pilot escape from high-speed aircraft routine; design passes wind tunnel tests.**

DAYTON, O.—Air Force's Wright Air Development Center here is nearing the test stage with advanced equipment that may make pilot escape from supersonic aircraft more a routine event than a miracle.

Ever since last February, when North American test pilot George Smith bailed out of his control-jammed F-100 Super Sabre at about 777 mph and miraculously survived, AF officials have virtually written off the ejection seat as a means of escape beyond Mach 1.

Smith became the first to make a supersonic bailout at low altitude (6,500 feet) and live. But even so, he spent months in agonizing pain and weeks in blindness from the terrific beating he took from dense air blasts upon ejection from the diving F-100.

•**What is more significant,** he became living proof of what USAF officials have been feeling for some time —that pilots bailing out at supersonic speeds need considerably more protection than the ejection seat affords.

And the Air Research and Development Command's WADC may have the answer in experimental escape capsules now entering advanced stages of testing.

One of the more promising is a design formed in large part by the cockpit canopy of the plane itself. It is being built under WADC contract by Stanley Aviation Corp. of Denver.

A. B. Nutt, chief of the Wright Field escape development section, disclosed recently that this capsule design has passed wind tunnel tests and a full scale mockup has shown that its automatic, split-second closing system will work.

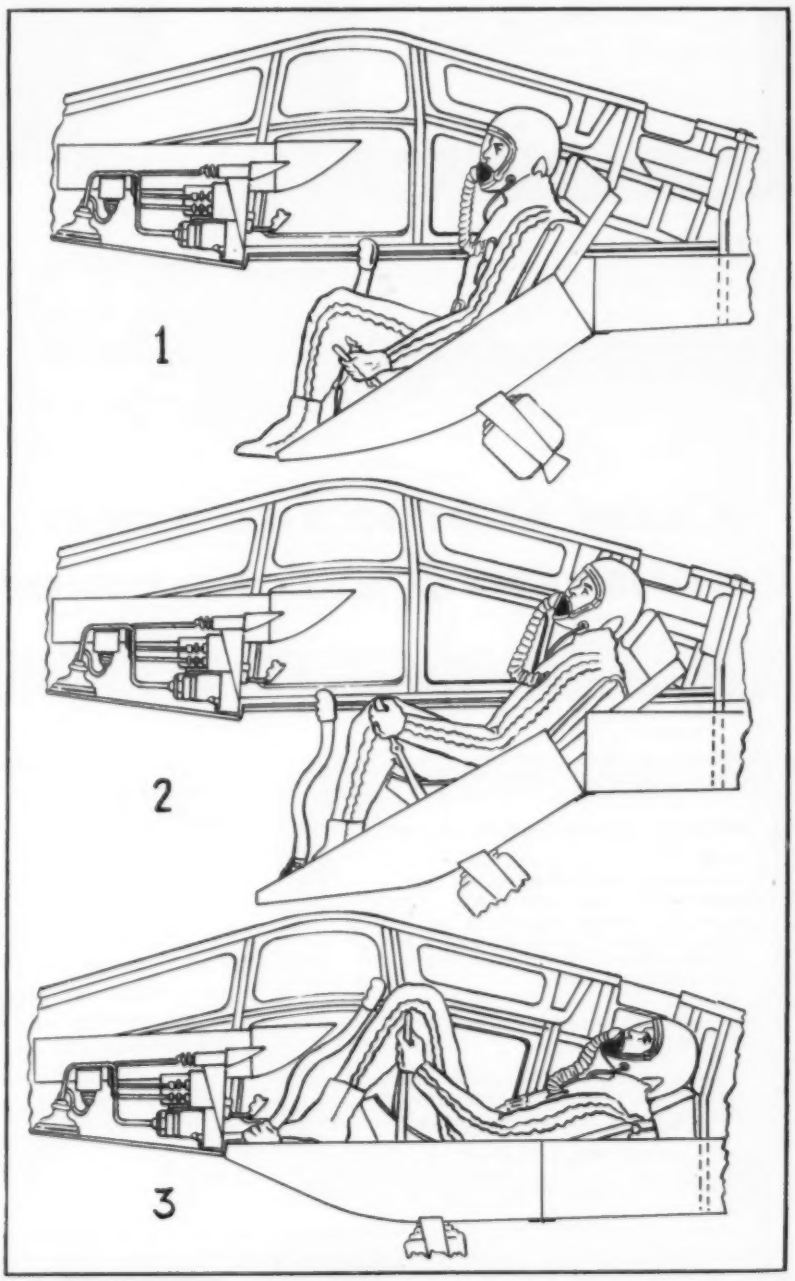
•**Supersonic tests** on rocket-powered test sleds, presumably at Holloman AFB, New Mexico, are scheduled for the summer of 1956.

Here's how the new WADC capsule will work:

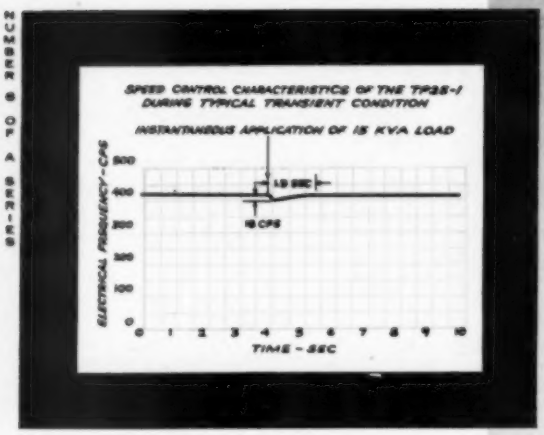
When the pilot pulls his ejection lever, his seat rotates up into the canopy. A door behind the seat also rotates upward to enclose the pilot in an airtight protective cocoon.

Once closed, a 12,000-pound thrust rocket with ¼-second duration blasts the capsule clear of the aircraft. Another six-tenths of a second and a 40-inch drogue chute explodes from the capsule to slow it down and stabilize its flight. As added protection, a boom with trim controls at the rear of the capsule keeps its heading at the proper angle.

When the capsule "slows" to 190 mph and descends to a safe altitude of




**New escape capsule under WADC development moves pilot from sitting to supine position in less than ⅓ of a second. A 12,000 pound thrust rocket blasts capsule free of supersonic fighter where parachutes take over.**



Model TP25-1

Drives 15 kva Alternator — Holds 400 ± 1 cps

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In the TP25 a rapid response butterfly valve modulates the supply air to regulate speed. A sensitive yet rugged all-pneumatic control system is an integral part of the unit. Response is extremely rapid and speed is held constant within ±¼ of one per cent over full operating load range.

A new overspeed control permits in-flight resetting if desired.

Tested under simulated aerobatics — speed variation only 1.9% at 9G's while under full electrical load.

This new addition to Stratos' line of Air Turbine Drives brings constant speed into a higher output range. Already fully qualified and flight-proven, dash numbers of the Model TP25 are driving alternators in two of the newest supersonic fighters.

Designed specifically for operation in high performance aircraft the TP25 functions with bleed air inlet temperatures of 900° F at inlet pressures over 450" HgA, ambient temperatures of 250° F and cooling air temperatures of 210° F. It is not altitude limited, operating to the service ceiling of the new aircraft in which it is installed.

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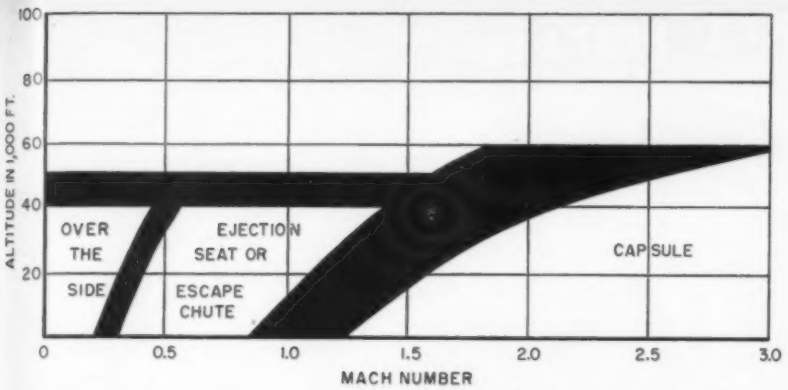
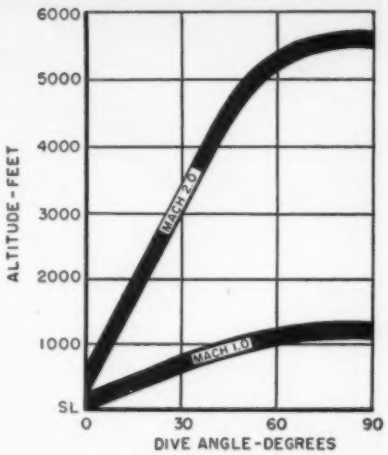



Probable ranges and areas of overlap for various escape systems as viewed by Douglas Aircraft Co.'s A. M. Mayo. Shaded areas point up variations in design approach and in interpretation of human tolerance data.




How speed and dive angle limit successful pilot escape based on probable human deceleration tolerance.

15,000 feet, a 48-foot parachute is automatically released. It "floats" the capsule the rest of the way to the ground.

•**Once the jet pilot** decides to bail out, rotation of the seat into the canopy and sealing of the door takes less than one-third of a second. These parts are literally "blasted" into position by a cartridge which actuates the mechanism.

As the rocket unit blasts the capsule free, the pilot is subjected to forces of about 12g, but he's in a supine or lying position and is easily able to withstand them.

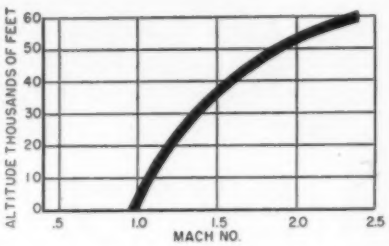
Then as the capsule loses speed after separation, he experiences deceleration forces in the order of 18g. WADC engineers estimate the time to slow its speed from above Mach 1 to 190 mph at somewhere between three and six seconds depending on the speed of the aircraft at bailout.

When the capsule first closes it traps the pressurized air of the cockpit so the pilot has no breathing problems on his descent to low altitude. The package carries with it only a radar scope, gunsight and primary flight instruments from the aircraft, but has a hand-crank radio for communication and complete survival equipment.

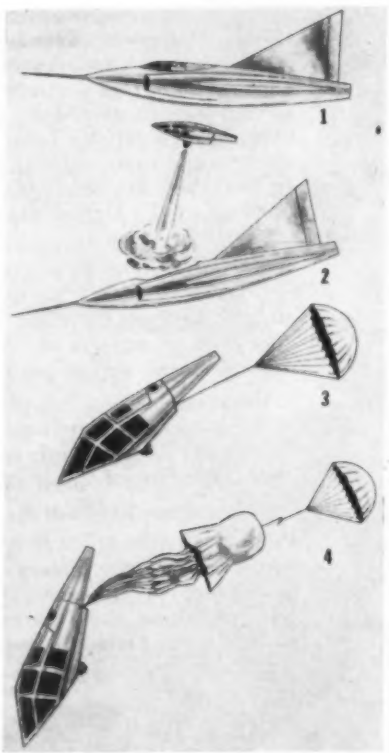
•**Once on the ground,** the pilot can leave through a hatch in the canopy or through the sealing door. If he lands on water, he can stay put, for the capsule will float.

Actual work on this design started four years ago, according to Anthony Mastriana, WADC capsule project engineer. Although its original intent was for experimental use with the AF's Convair F-102 supersonic fighter, Mastriana says similar systems can be adapted to other supersonic aircraft.

One of the major factors initially obstructing the acceptance of the capsule escape concept was the weight penalty usually associated with such designs. However, in the WADC development, the added weight of the system is only about 130 pounds. Of this, 43 pounds are for the rocket unit alone, and plans are underway to use a smaller (8,000 pound thrust) unit that weighs only 23 pounds. ◆ ◆ ◆




Maximum speed for safe seat ejection based on probable deceleration tolerance.




Four-stage operation of WADC capsule: (1) Pilot moves to lying position and door seals capsule. (2) Rocket blasts unit free of aircraft. (3) Forty-inch chute slows descent and stabilizes flight. (4) Forty-eight-foot chute effects safe landing.

## Braniff Device Tests Prop Stepmotor

Braniff Airways propeller shop technicians have devised a new tester that takes the trial and error out of prop governor stepmotor accuracy checks.

The unit is a key component in the Hamilton Standard prop control system on Braniff's DC-6 and Convair aircraft and keeps propeller pitch correctly adjusted for all flight requirements.

The new tester provides a positive means of making certain there are 1.22 ounce-inches of torque (supplied by magnetic force) in the stepmotor rotor. Foreman Les Schaeffer and Inspector Harvey Bailey developed it from old radio transformers. They were rewound to produce a variable three-phase voltage that is used to control magnetic force in the stepmotor rotor.

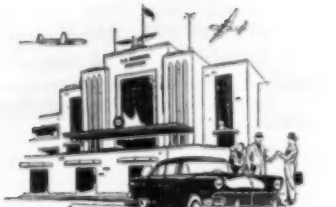
Former method used at Braniff involved testing with a universal magnetizer, but it meant considerable trial and error to prove out a correct setting. With the new unit the airline now tests and sets magnetic force accurately in about 45 minutes.

## Chance Vought Gets $100 Million Order

Chance Vought has received a $100 million production order from the Navy Bureau of Aeronautics for its supersonic F8U-1 Crusader, which is powered by Pratt & Whitney's J57 engine. Winner of a Navy competition for a day fighter, the F8U prototype has been flying since March 20.

**The modern, attractive** Hertz counter above, located at La Guardia Airport, New York City, is Hertz' latest addition to its long list of airport rent a car offices. This new office, like other new Hertz airport offices being installed all over the world, is helping to bring you new passenger revenue. And here's how it's being done!

## Hertz opens new office at La Guardia Airport NEW YORK CITY



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To tell your passengers of the Plane-Auto Travel Plan, Hertz spends over $1,000,000 a year for advertisements in national magazines. No other company spends nearly as much to promote the Plan. Neither can any other company offer your passengers 10,700 clean, new cars . . . and more than 30 years' experience in courteous rent a car service.

Hertz also assures you of steady Plane-Auto Travel Plan business because more than 1,500,000 qualified persons now hold Hertz Charge Cards and Courtesy Cards. Hertz also honors Air Travel Cards and Diners' Club Cards.

**How you can help sell the Hertz Plane-Auto Travel Plan**

Promote the Hertz Plane-Auto Travel Plan in all your advertising, displays, folders and any other advertising and promotional programs. And best of all: *urge your ticket sellers and reservation clerks to ask your passengers this simple question:* **"May I reserve a Hertz car for you at your destination?"**

**For complete information about the Plan, write:**

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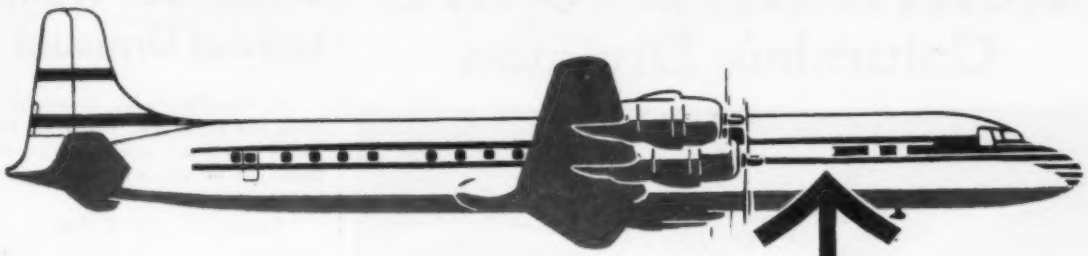

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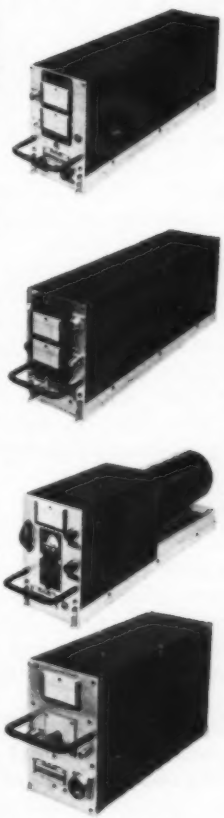
Utilizing revolutionary new design principles, Aer-O-Com engineers have cut across barriers of weight and space. Result: light weight, small package, optimum performance H.F. communications equipment with extreme ruggedness and versatility! Available for operation on 27.5 VDC or on 115 V. 300-1000 CPS.

Weight is dramatically reduced. Total equipment —ATOM Transmitter, STAR Receiver, *Modulator Power Supply, and SUN Automatic Antenna Tuner— weighs but 75 pounds, only 150 pounds in dual installations!

Racks may be fabricated smaller and lighter—effecting further savings in weight. New economies are possible in aircraft design.

Write for full particulars and specifications!



**1. STAR RECEIVER:** Frequency Range 2-22 mcs. Completely automatic tuning requiring only insertion of crystal through front panel. Maximum of 192 crystals may be installed in any desired frequency pattern. Receiver supplies R.F. excitation for Atom transmitter(or Model AT 144 Transmitter) for simplex operation. Can be connected for simplex operation on any channel and cross band operation on any other channel, the latter being limited only by the number of crystal positions in the transmitter. Maximum tuning time 5 seconds.

**2. ATOM TRANSMITTER:** Frequency Range 2-22 mcs. For simplex operation receives excitation from Star Receiver. For cross band operation, optional assembly may be installed inside front panel to accept up to 23 crystals. Transmitter tuning is automatic thus permitting complete freedom in arrangement of frequency plan. Maximum tuning time 5 seconds. Transmitter circuitry permits use with either SUN Tuner described below or Model AAT Type 4. Transmitter contains necessary relays for interlocking in a dual installation.

**3. *MODULATOR POWER SUPPLY:** DYNE operates from all 27.5 VDC—PACK operates from 115 volts 300-1000 c.p.s. Clipping and suppression provide high average level of modulation with low distortion.

**4. SUN AUTOMATIC ANTENNA TUNER:** The simplest, lightest and fastest automatic tuner. Contains no tubes, R.F. bridges or control relays. Tuning time averages 5 seconds for typical international frequency plan. Operates efficiently into fixed wire antennae, grounded or open, over range 2-22 MCS.

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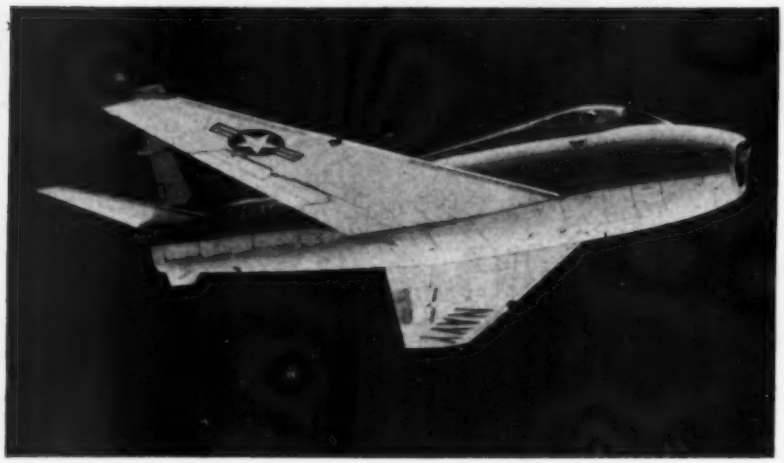
# NORTH AMERICAN'S Columbus Division



## gives Experienced ENGINEERS the most modern facilities for AIRPLANE DESIGN in OHIO

North American's Columbus Division is a complete airplane design, development and manufacturing organization . . . now in full production . . . in Ohio.

To many engineers, this has been particularly good news. It has meant career opportunities in the Middle West where complete airframe manufacturers are few. North American's Columbus Division still has a few openings for experienced engineers.

Comparatively young, North American's Columbus Division has already gained success that has established the organization's future: The highly-regarded FJ-4 Navy FURY JET* is a Columbus product... from concept, through development to line production. Naturally, personal opportunity is excellent in a younger organization; with opportunity goes stability because of the association with North American Aviation, the company that has built more airplanes than any other in the world.

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# British Jet Trainer Layout Unusual

F. G. Miles Ltd., Shoreham, England, has taken the wraps off its new M.100 student side-by-side jet trainer, prototype of which is nearing completion.

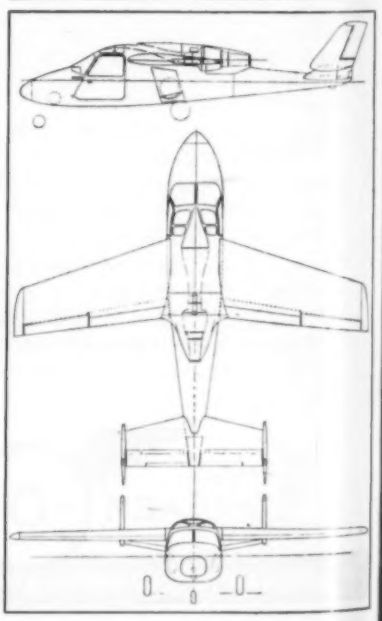
Layout of the M.100 is unconventional (see three-view drawing). Prime design aims were:

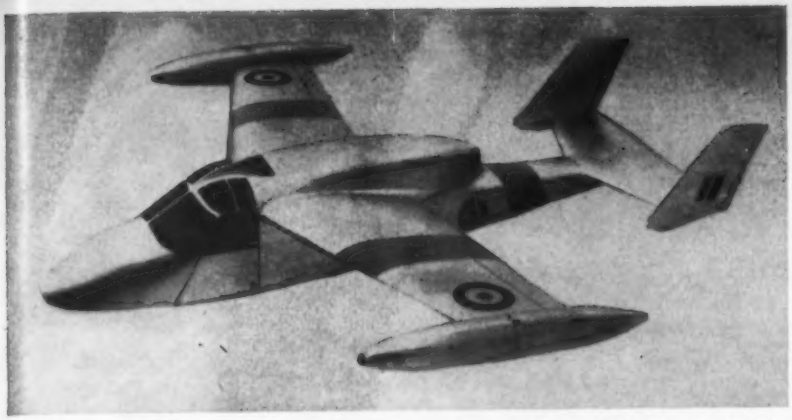
- To give best visibility to both pilots with side-by-side seating.
- To achieve crew safety with low-set cg intended to improve handling, plus a central keel to withstand belly landing and a simple emergency and ground exit.
- To minimize fire risk by mounting the powerplant or powerplants above and aft of the cabin behind a steel bulkhead, and carrying all fuel in the wing.

The plane has been designed to take either a single Blackburn Marbore II or a pair of Blackburn Palas 600 turbojets. With the engines mounted on top of the fuselage, little change is required to adapt from one to two engines. A low-set tailplane, with dihedral and end-plate fins, insures ample clearance for the jet exhaust. A central air intake of the NACA flush type in the roof feeds equally well to one or two engines.

M.100 also is being offered for adaptation as a 450-mi. range communications airplane for liaison and army observation and as a light attack and ground support type.

Dimensions: Span, 28 ft.; length,





27 ft.; height, 6 ft., 3 in.; wing area, 140 sq. ft. Gross weight as a trainer is 3,100 lbs., as a communications plane, 3,600 lbs.

Performance: Maximum speed at sea level, 295 mph (284 for two Palas engines); Cruise at 20,000 ft., 268 mph (249); landing speed, 70 mph.; range at 10,000 ft. at 150 mph 463 mi. (400).; maximum diving speed 460 mph.

## They Took Part in Operation Sagebrush

Operation Sagebrush, recent Army and Air Force maneuver at Fort Polk, La., gave the two services a chnace to test new concepts of warfare and new equipment. More than 140,000 troops and 1,250 aircraft took part in the exercise. Used operationally for the first time was the Fairchild C-123B assault transport (top). The Douglas Honest John free-flight rocket (center) was fired in a simulated manner and troops and supplies were brought in by Douglas C-124s (bottom).

## Magnuson Bill Would Aid States-Alaska Airlines

Two States-Alaska airlines would become eligible for permanent certification under terms of legislation now being drafted by Sen. Warren Magnuson (D-Wash.), chairman of the Interstate & Foreign Commerce Committee.

Magnuson revealed he plans to sponsor such a bill, and has received "informal" White House approval. His disclosure came during hearings conducted by a subcommittee in Seattle during October.

Pacific Northern Airlines and Alaskan Airlines would be the only carriers affected by the proposed legislation. Pan American and Northwest, both of which serve Alaska from the United States, are already permanently certificated.

Magnuson's proposal came in response to demands from PNA President Arthur Woodley that Congress act in face of what he called "procrastinations" of the Civil Aeronautics Board. Woodley contended his airline and the Territory of Alaska were both victims of the Board's failure to authorize operation over an extended period of time.

Magnuson indicated that his bill would reclassify States-Alaska carriers from "foreign" to "domestic" for purposes of regulation under the Civil Aeronautics Act, and would thereby make the two carriers eligible under last session's Local Service Carrier Permanent Certification Act.

## Importance of Spares Demonstrated Clearly

Importance of spares was illustrated by Jim Shaunty, director of stores for TWA, at a management information program at Lockheed Aircraft Corp., with the following example:

"A pre-flight inspection at Chicago showed a broken bracket on a landing gear door. We'd never had one break before. The nearest one was at our Kansas City warehouse, two hours away. By the time we'd flown in the bracket and installed it, we lost three hours. Our passenger list dwindled from 60 to 23."

Brig. Gen. Kenneth H. Gibson, commanding general of the 8th Air Division of the Air Defense Command, told the meeting that "every man, woman and child in the United States pays $1.80 per year to keep the radar Constellations in the division flying."

"That's part of the price of defense," said Gen. Gibson. "But I'm a taxpayer, too. I want my money's worth. I want those planes flying—not on the ground. That's why I worry about spare parts."

C-130 HYDRAULICS SYSTEM ALTITUDE OPERATIONAL TESTS

## LONG RANGE EXPANSION PROGRAM REQUIRES QUALIFIED ENGINEERS

Advanced projects in large aircraft categories are creating openings for qualified Engineers in the fields of Design, Research, Laboratories, Structures, Flight Test, Dynamics, Operations Research, Preliminary Design and many others.

Qualified Engineers interested in becoming associated with an Engineering Organization engaged in complex and far-reaching assignments will be supplied with further information. Your inquiry will be held in strictest confidence.

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# SC-54s Update AF Rescue Service, Cut Costs

Air Force's Air Rescue Service, long hampered by the inefficiencies of operating a fleet of cast-off SB-17 and SB-29 bombers as rescue aircraft, is due to get a new lease on life.

First of a group of newly fitted SC-54 (converted Douglas C-54D) transports has been delivered by Convair-Ft. Worth to ARS headquarters at Orlando Air Force Base. By March 1956 some 38 will be in worldwide rescue squadron service.

AF officials say the new SC-54s will not only permit a more modernized rescue operation, but will save more than $3 million a year in costs over the converted World War II bombers.

They estimate a lifeboat-carrying SB-29 costs ARS about $446 per flying hour compared with only $169 for the SC-54, a 62% reduction. And by their ability to carry four of the newly developed MA-1 Air Rescue Kits (ARKs), life-saving potential of the SC-54 jumps to 160 persons against only 14 for the lifeboat-toting SB-29.

• **Plan is** to introduce the new aircraft to supplement Grumman SA-16 Albatross amphibians which ARS uses for operation on island, coastal and open waters, as well as from short, unprepared runways, ice or snow. For its mission, the AF considers the SA-16 a rescue vehicle unduplicated and unequaled by any other aircraft.

Role of the specially-fitted SC-54s is to provide coverage beyond the range of the SA-16, primarily in precautionary-type missions.

On a typical mission, the four ARK units carried aboard SC-54s will form the nucleus of a basic rescue plan for which the aircraft were modified.

Each ARK includes two 20-man rafts and three survival kits designed to be dropped to survivors in open seas.

The two rafts are connected by 840 feet of floating line along which the three survival kits are equally spaced.

NEW DOOR ON SC-54 shown here at right is designed for in-flight opening, is used for survival kit drops and Pararescue jumps.

• **Usually the ARK** is dropped upwind of survivors and the rafts are automatically inflated by static lines as they leave the aircraft. Since the rafts float high in the water and the kits have practically no mass above the water line, normal winds cause the rafts to drift past the survivors and they are encircled by the floating line.

All they have to do then is grasp the line, pull the raft to them, climb aboard and haul in the survival gear.

To tailor the C-54Ds for this type of operation, modifications now in process on the fleet at Convair call for:

• **New door installation**—a specially modified door can be opened in flight for equipment drops and jumping Pararescue teams.

• **Added Range**—New fuselage tanks increase total capacity to 3,726 gallons, sufficient for 18 hours flight.

• **Pneumatic flares**—A completely new pneumatic flare-launching chute can be loaded in flight and fired either by the pilots or rear scanner. The removable chute is mounted aft and uses dry compressed air or nitrogen to discharge flares. Enough compressed gas is carried aboard to fire all flares with a 50% reserve for possible overloads.

• **B-36 Blisters**—Rear scanner can view the terrain directly beneath the aircraft from an altitude of only 700 feet through new B-36 type blisters installed in the fuselage. Special seats make the scanner's long, tedious job easier and more comfortable and new defrosters prevent the blisters from fogging or icing up. ◆ ◆ ◆

B-36 BLISTER gives view of terrain beneath aircraft from 700 ft. altitude.

FIRST OF A FLEET of newly modified SC-54 aircraft (above) has been delivered to Air Rescue Service. Note scanner blister on fuselage aft of wing fillet.

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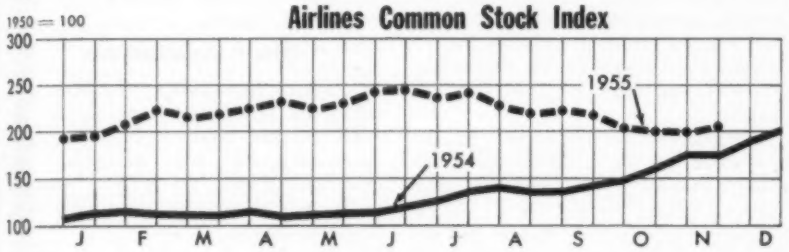


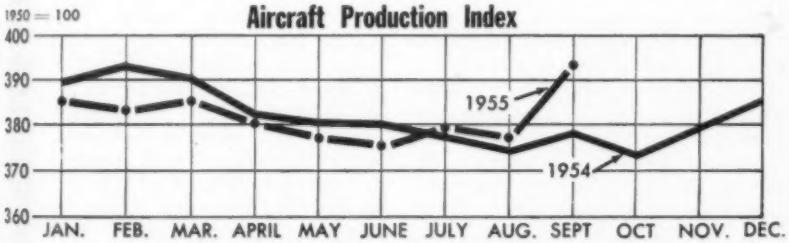


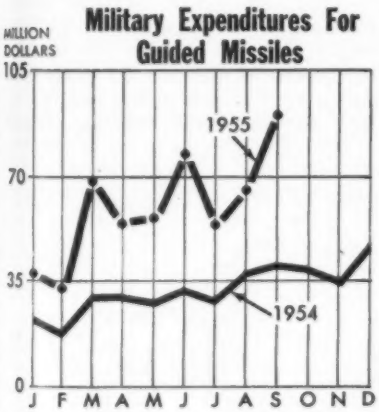


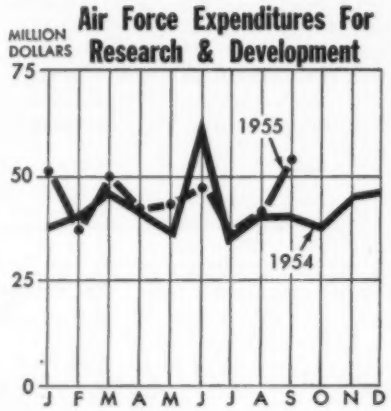


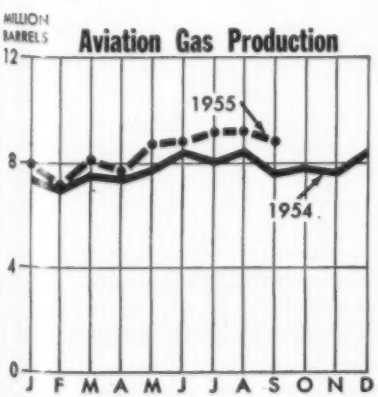


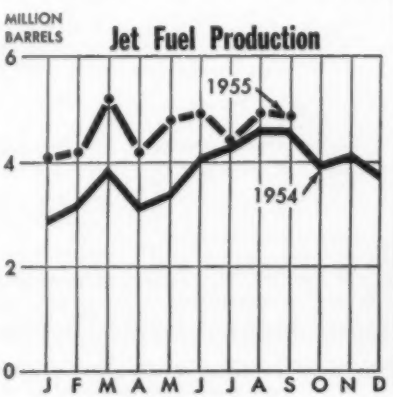



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narco simplexer

VHF RECEIVER and TRANSMITTER

All the frequencies you want for any tower or center communications can be accommodated in the new 27 channel Narco Simplexer. This top-quality communications unit embodies a wide-band transmitter—actually six separate transmitting circuits — for uniformly strong transmission plus the famed Narco "whistle-stop" tuning feature which lets you tune the VHF receiver precisely to the frequency desired.

The Simplexer accommodates all 24 frequencies used between 118.1 mc and 122.8 *plus* 126.7 mc, *plus* two additional crystals for special purposes.

No other communications unit available has the quality, the proven stamina and reliability plus compactness for anywhere near the price. Your communications problems will be solved with the new VC-27 Simplexer. See it at your Narco dealer's or write for new brochure.

**Omniplexer Adds OMNI for only $195**

Here's the answer for a low-cost, accurate Omni—the Narco Omniplexer which can be plugged into any Narco Simplexer. Only 3" high and 6¼" wide, it has vernier tuning for precise course setting. Ideal as a basic navigation system or the low-cost answer for dual omni.

narco

NATIONAL AERONAUTICAL CORP.

Ambler, Pennsylvania

# Bendix Trims 'Fat' from Airborne Electronics

**Size and weight reductions made through use of new materials, components and layouts instead of revolutionary circuitry.**

EDITOR'S NOTE: *This is the second of three articles on airborne electronic equipment developments and plans of three important manufacturers.*

*Radio racks in civil aircraft already are bulging with equipment. The need for new equipment to meet requirements of a refined air traffic control system can be expected. New aircraft will demand greater space and weight efficiency and improved cooling techniques in the equipment they use.*

*The first article dealt with* CANARI *(Communications and Navigation Airborne Radio Instrumentation) as a systems concept approach to space and weight problems. In this article, the point of view and accomplishments of another manufacturer engaged in the push towards smaller and lighter equipment are discussed.*

HENRY P. STEIER

Emphasis on the application of new materials, components and layouts to conservative circuitry, with special attention to maintenance factors, characterizes the redesign efforts of one manufacturer of airborne electronic equipment.

Engineers of Bendix Radio, division of Bendix Aviation Corp., have stressed new materials rather than revolutionary circuitry in their approach to the size-weight issues. Also, in contrast to current attention being given the systems concept, Bendix designers adhere to the belief that each piece of equipment should permit flexibility of installation. Their designs, they believe, should permit easy intermixing of different companies' equipments by an airlines user.

## Self-Sufficiency Stressed

For this reason Bendix does not favor designs that share the same power supply, nor overall system deviations from standard ATR form factor depths. These might be 12½ or 19½ inches, depending upon the particular Aeronautical Radio Inc. characteristic. The different requirements of each airline, Bendix says, necessitates self-sufficiency of individual electronic equipments in matters of installation location and source of power.

•**In working towards** smaller size equipments, Bendix says it intends to consider maintenance factors strongly as it finds ways to accomplish the reduction. First attack on the size-weight problems was made on "old standby" equipment.

Bendix, which pioneered in the production of the radio compass, recently marketed a new automatic radio direction finder housed in a ¼ATR package. Designed to replace the old MN-62 and ARN-6 models, the new ADF has provision for a flush sense antenna that is particularly compatible with the needs of jet-age aircraft.

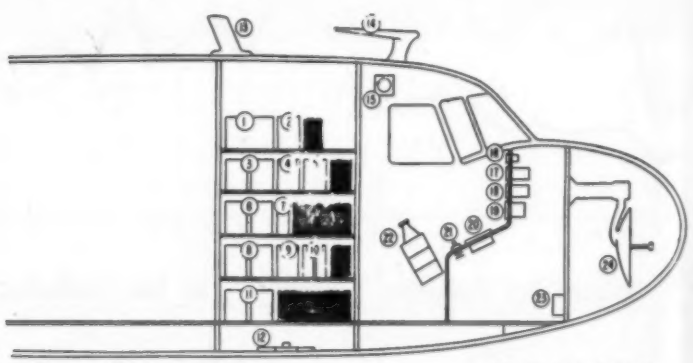
Use of new material is especially well exemplified in the case of the new ADF antenna. During World War II the Germans used a loop antenna, employing ferrite rods, that was submerged in the aircraft's skin to reduce drag. Taking advantage of the form factor permitted by the ferrites, Bendix designed a new direction-finding antenna, Type LPA-70A, that fits flush with the aircraft's skin and is covered by a plastic plate coated with conductive material to drain off static charges. These charges are particularly troublesome above 400 mph. Ceramic-ferrite forms the major parts of the new magnetic antenna. Weight was reduced to about one-half that of the old MN-60 loop.

## Other Applications

Other applications of new materials are noted in the redesigned ¼-ATR marker receiver, 1 ATR VHF communications and navigation receiver-transmitter ½ATR weather radar synchronizer-power supply and audio accessories.

•**Smaller intermediate** frequency transformers that would withstand higher temperatures were obtained by going to units that used ferrites in place of powdered iron. Slug tuning in place of heavy ganged capacitors saved weight. New alloys in transformer and motor laminations were effective aids to the problems. The TA-20 VHF transmitter uses slug tuning and a simpler mechanical tuner.

The new ½ATR SYN-1B reflects what can be accomplished by tackling weight in power supplies. By combining power supplies for the radar into one unit, 30 pounds were saved. To do this, the new high efficiency silicon



① RDR-1 RADAR TRANSMITTER RECEIVER
② SYN-1B RADAR SYNCHRONIZER-AMPLIFIER-POWER SUPPLY
③ RA-1B VHF RECEIVER (DUAL)
④ SCL-3 SELECTIVE CALLING UNIT
⑤ MI-38 PASSENGER ADDRESS AMPLIFIER
⑥ TA-20 VHF TRANSMITTER (DUAL)
⑦ MKA-1 MARKER RECEIVER
⑧ MN-85 VOR RECEIVER (DUAL)
⑨ MN-89 VOR ACCESSORY UNIT
⑩ GSA-8 GLIDE SLOPE RECEIVER (DUAL)
⑪ DFA-70 ADF RECEIVER (DUAL)
⑫ LPA-70 FLUSH ADF LOOP ANTENNA (2)
⑬ ABA-1B VHF COMMUNICATIONS ANTENNA (2)
⑭ MS-102 VHF NAVIGATION ANTENNA
⑮ MI-51 AMSPEAKER
⑯ IN-5 MARKER INDICATOR
⑰ MA-72 RADIO MAGNETIC INDICATOR
⑱ MN-87 OMNI-MAG
⑲ CNA-2 TRANSISTOR AMPLIFIER JACK BOX
⑳ CNA-70 ADF CONTROL PANEL
㉑ MN-81 VOR SELECTOR SWITCH
㉒ PPI-1 RADAR INDICATOR
㉓ MN-82 GLIDE SLOPE ANTENNA
㉔ ANT-1 RADAR ANTENNA

**Sketch of completely Bendix-equipped aircraft cockpit and radio rack. Shaded areas show rack space made available by recent reductions in size of equipment.**

rectifiers were used in place of selenium rectifiers.

Also, input power requirements were reduced by adding a magnetic decentering system for the PPI-1D radar indicator system. This feature saved 13 pounds. Altogether 13 tubes were removed from the heavier SYN-1A. Weight of a single indicator radar system is now about 117.5 pounds for X- or C-band.

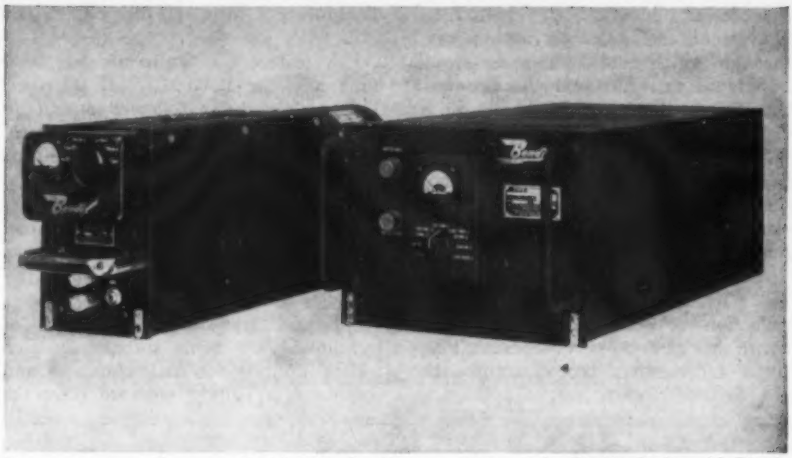
### Smaller Tubes Used

•**Smaller vacuum tubes** of the ARINC-approved miniature type are being applied, as well as tubes needing less driving power, as Bendix redesigns its equipment. In general, Bendix says, its customers are opposed to soldered-in sub-miniature tubes because of replacement difficulties.

Completely "canned circuitry" of the type where most circuits in a system are arranged in plug-in cans for quick disassembly and replacement is not favored by Bendix engineers. They believe it is "heavier, more complex, more expensive and less reliable" than their sub-chassis system. That system, as applied to the DFA-70 ADF receiver, for example, permits removal of the loop antenna tank, sense antenna tank, mixer grid and variable frequency oscillator sub-chassis assemblies by removal of a few soldered joints, loosening mounting screws and pulling out a shaft.

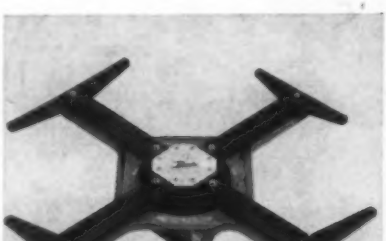
In the MKA-7A marker receiver, the rf, if and audio stages are built on a narrow chassis attached to a hinged panel. This arrangement is designed to afford easy accessibility for servicing.

Bendix engineers say manufacturing of modular units aids manufacturing costs but is tougher on overall reliability and on maintenance costs. They do not believe the airlines would be willing to throw modules away, nor to return them to the factory for repairs. They also contend many types of modular construction require expensive test equipment for performing tests on the modules.



Size comparison of new and old VHF Bendix transmitters. Left: TA-20. Right: old TA-18.

•**Neither printed wiring** nor printed circuits are being used at present. Difficulties encountered in replacing printed circuit components and repairing printed wiring, as well as lack of flexibility in incorporating modifications and improvements after equipment has been purchased by users, has been a deterrent to adoption of such construction.



New radio compass antenna for flush mounting in aircraft's skin. Four arms are constructed of a ceramic-ferrite material.

No transistors are used excepting in the CNA-2 interphone audio panel. Redesign of this equipment using two transistors, together with compact design of selective calling equipment, has saved ½ATR of rack space and 20 pounds. Bendix predicts a strong swing toward transistors as prices decrease and the industry learns from field results whether transistors can improve equipment reliability.

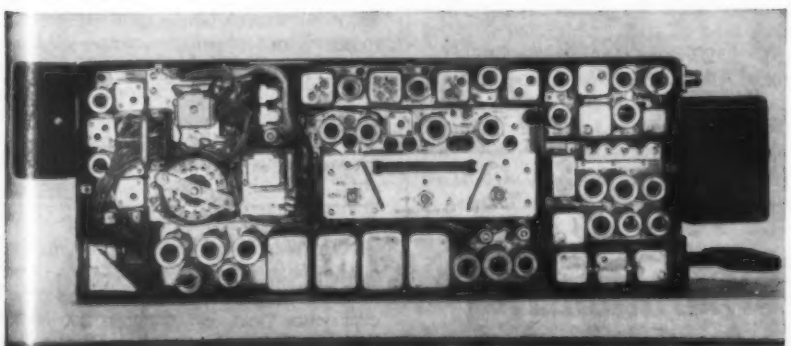
Cooling of Bendix equipment is done by convection with the cases used as a dissipation element, and with holes in the case tops to provide ventilation. An exception is the fan-cooled transmitter-receiver and synchronizer-power supply for the weather radar system.

Two layout factors were prominent in the Bendix evaluation of ways to reduce size. These were reduction of the "sand factor" and heat distribution. The "sand factor" represents the amount of sand that would fill unoccupied space in a given packaged equipment. A zero factor would be ideal.

• **Tube layout distribution** throughout the new smaller equipment was arranged to permit uniform heat dissipation through case vent holes. This eliminates hot-spots sometimes encountered when chassis size is reduced. To reduce volume, new types of capacitors, insulating plastics and tube types were chosen. Silicon diodes were used for reducing heat produced by tube filaments and for reducing component volume.

### Provision for Cooling

Bendix says that although it is still building equipment without need for external cooling, provision was made in the SYN-1B radar unit for a system of cooling that may be used in future aircraft. The SYN-1B has notches in the case bottom that can be knocked out to produce holes. The future system eventually might employ collector



Side view of MN-85F VOR receiver. Divided sub-assemblies may be removed for servicing. Test points are brought out to tops of each assembly.

shrouds or ducts at the bottom of equipment and holes on top of cases through which cooled cabin air would be drawn and then exhausted outside the plane. The Lockheed Electra is expected to use such a system.

No set policy exists with respect to heat dissipating tube shields. Where they are needed they are used. For example, one tube of the MKA-7A marker receiver uses a black-body heat dissipating shield.

• **Bendix plans** call for continuing reduction of size and weight in its entire line of airborne equipment. Plans for a radar safety beacon transponder are well developed, but its appearance in equipment form will not occur until 1956.

A feature for future use has been built into the RA-18C VHF receiver. This is a cathode follower output to equip it "for the visual traffic control system of the future." This would be for the proposed Air Traffic Control Signalling System. The RA-18C and TA-20 are designed for double channel duplex operation (transmit and receive simultaneously on two different frequencies differing by 6 mc).

Bendix says simple extensions of techniques now being successfully used by the military for data reduction and command signalling seem to offer the most promise for a modernized interpretation of the old "Private Line" of the Radio Technical Commission for Aeronautics Special Committee 31 report. ◈ ◈ ◈

**Space and Weight Savings In Redesigned Bendix Airborne Equipment**

| Equipment | Rack Space Saved | Weight Saved (pounds) |
|---|---|---|
| Dual ADF | 1½ ATR | 66 |
| Airborne Weather Radar | ½ ATR | 30 |
| Dual VHF Communications | 1 ATR | 31 |
| Dual VHF Navigation (Single Marker) | ¾ ATR | 16 |
| Audio (Interphone, Cockpit Speakers, PA amplifier, Selective Calling) | ½ ATR | 20 |
| TOTAL | 4¼ ATR | 163 |

## SAS Gets Special Polar Equipment

The Scandanavian Airlines System is equipping its projected Polar route from Scandanavia to Japan with radiotelephone communications stations. The stations, to be located in the Arctic regions, will be provided by SAS, but some of the stations will be operated by government agencies of the countries where the equipment is located.

Stations will be installed in Norwegian, Canadian and American territory to support the new route with weather and position information. The stations are expected to be ready by the time SAS's new Douglas DC-7Cs are delivered in the Fall of 1956.

SAS has been evaluating X-band radar and will install weather-mapping radar in the new planes. Together with weather-mapping, the radars will be used to improve navigation accuracy during poor visibility conditions. When being used in ground-mapping position, the radar will supply drift information for more exact computation of ground speed. This information is needed in "dead-reckoning" navigation.

To supply drift information, the indicator of a radar could be equipped with a cursor. By this means drift measurements could be made using a radar derived picture.

### CORRECTION

In recent coverage of the Champion Spark Plug Conference (Dec. 7 issue, p. 36) a statement on ignition analyzer experience was erroneously attributed to W. J. Krzyzek of Trans World Airlines. The statement was made by a Northwest Airlines' representative.

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Two on the job make any mission *twice* as easy . . . just as dual ARC Omni installations double efficiency, ease and confidence in navigation. With dual omni 15D equipment, a single pilot can make a fix *faster* . . . he can fly any omni track while also cross-checking for position. It's easier to make transition from omni to runway localizers.

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ARC 15D Omni is compact, lightweight, CAA certified, and now employs new course indicator which combines course selector and cross-pointer meter in a single space-saving unit.

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## ARINC Report on TACAN Unfavorable

Members of Aeronautical Radio Inc.'s Airlines Electronic Engineering Committee have received a report prepared by ARINC on the TACAN spectrum and channeling problems as they now exist.

Prepared as a technical analysis documenting known factors, the report was written as a guide for committee members to judge whether specific proposals made thus far adequately provide for Common System long-range requirements.

Based upon the known factors and the state of the electronics art, ARINC's analysis shows little additional channel availability in the TACAN system. The report concludes that even if the present DME system were shut down, and if interference between TACAN and the radar safety beacon is as serious as anticipated, there would be few, if any, more channels for the azimuth and distance functions than are presently available in VOR/DME.

ARINC's analysts say they are not aware of any way to expand the number of TACAN channels without eliminating the implied military plan for multiplexing other functions on TACAN channels.

## DME Pays Off in Australia

Widespread use of distance-measuring equipment by civil transport aviation in Australia has made "positive contributions" to the economics of airspace utilization and scheduled airline operations, according to Australia's Department of Civil Aviation.

All transport and charter aircraft operating into Australia's main airports must now carry DME equipment if they are operating under instrument flight rules conditions. The only concessions to the mandatory rule granted are those made if equipment is not available.

DME stations have been sited to provide nearly complete coverage at minimum en route altitudes in areas served by airline operators. An increase in air route utilization is anticipated, since the additional accuracy with which pilots can define their positions while using DME has shown aircraft separations can be reduced. "Fixes" can be obtained by interpretation of DME and visual aural range information.

Also, since pilot position reports have increased in accuracy, the Department of Civil Aviation is studying the possibility of reducing the number of position reports. This would reduce the load on both pilots and the telecommunications system.

Where terrain is not a limiting factor, satisfactory alternate homing and descent procedures have been developed using DME. Accordingly, it is now possible to eliminate a previous requirement that enough fuel be carried for flight to a suitably equipped alternate location if the destination had no means of let-down, other than by use of non-directional beacons.

To save time imposed by stacking delays when IFR conditions prevail, a new series of procedures has been developed using DME. The Department estimates about 60 per cent of instrument descents could be eliminated by effective use of DME under most conditions that prevail in Australia. The Australian DME program calls for 77 stations. There are 39 commissioned stations, and 58 are installed and operating. The remainder are being installed.

## Foreign Lines Buy X-Band

KLM Royal Dutch Airlines and Alitalia Airline have purchased Bendix X-band radar. The Italian company will use the radar on DC-Bs. KLM will use it on its DC-7Cs now on order.

*with ARC's NEW CD-1 Course Director*

**Now it's easy to keep a straight, true course wherever you fly... make sure ILS approaches, maintain OMNI tracks with certainty. ARC's new Course Director automatically directs the pilot to the correct headings required for effectively intercepting and making good a desired track. Heart of the system, the Compass Slaved Directional Gyro, gives constantly corrected directional information. The ARC Course Director system is accurate to one degree. Computer portion of the system combines directional and track information obtained from the Localizer/OMNI Receiver and makes computations to provide the pilot with correct heading to intercept and/or make good a desired track and compensates for cross-wind. It relieves the pilot of 90% of his mental effort, helps prevent missed ILS approaches, saves time, effort and fuel, contributes to greater safety. Ask your dealer for complete information.**

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# Tall Structures Committee Moves To Resolve Aviation-TV Conflicts

The Joint Industry/Government Tall Structures Committee, established by the Air Coordinating Committee last January to investigate the conflict of aviation and television interests over the common use of airspace, has approved adoption of the single-structure multiple-antenna and the so-called antenna "farm" concept.

Members of the committee, meeting October 3, arrived at these findings without obtaining agreement from A. P. Walker, Manager of Engineering, representing the National Association of Radio and Television Broadcasters. Walker abstained pending consideration of the findings by the NARTB Board of Directors at a meeting next January.

• **Walker made it clear,** however, that his abstention should not be construed as either approval or disapproval of the report. "A policy decision of this magnitude," he said, "can only be made by the Board of Directors."

The Joint Industry/Government Committee recommended the location of all transmitting towers, government and nongovernment, regardless of height, in antenna "farms" wherever possible. The word "farms" is intended to describe groups of antennas.

The committee pointed out that the Federal Communications Commission has the authority to require radio and TV transmitting antennas to be placed in "farm" areas or require the use of multiple antennas on a single supporting structure. It then recommended that the FCC establish rules requiring that all applications for transmitting towers over 500 feet above the ground be reviewed by the Air Coordinating Committee's Airspace Panel, to determine aeronautical hazards involved.

• **The aviation viewpoint** on control of structures other than antenna towers, as expressed in the committee findings, was that the Department of Commerce should seek legislation, with the support of other interested agencies, to cover erection, location and height of such obstructions to aviation. FCC authority over unused or abandoned towers, the committee found, "is not clear."

**The Committee found full cooperation** between TV and aviation industries is assured on the matter of lighting and marking antenna towers.

The Committee agreed "in principle" to the objectives of providing protection of low altitude inter-city air routes; additional protection for high density traffic areas, present and forecast; increased protection for airways and much-used "flyways" and additional protection for areas in the vicinity of airports. Criteria will be developed jointly to afford the protections desired and to serve as a guide to both industries.

• **To improve** Air Space Panel procedures, it was agreed that after conclusions are reached solely on technical aviation considerations, the panel would determine whether a tower could be moved or shortened, or whether aviation concessions could be made. "It will obviously be necessary for ASP to consider the direct cost of some physical relocation either on the part of television or aviation, in order to determine whether the economic burden should rest with television or aviation," the committee said.

It was also agreed by aviation interests that radio and TV towers in excess of 1,000 feet above ground are, per se, considered to be unwarranted hazards to air navigation, but that under certain conditions towers over 1,000 feet may be required in "the public interest, convenience, and necessity."

Such towers would require "complete justification" by the applicant, excluding all the economic considerations except the direct costs of physical relocation.


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- Indicator and Microwave Tubes
- Semiconductor Devices

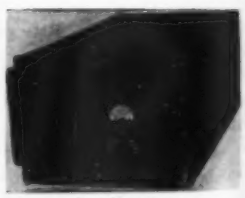
*Culver City, Los Angeles County, California*

Relocation of applicant must not cause disruption of an urgent military project.



**Collins C-Band Weather Radar**

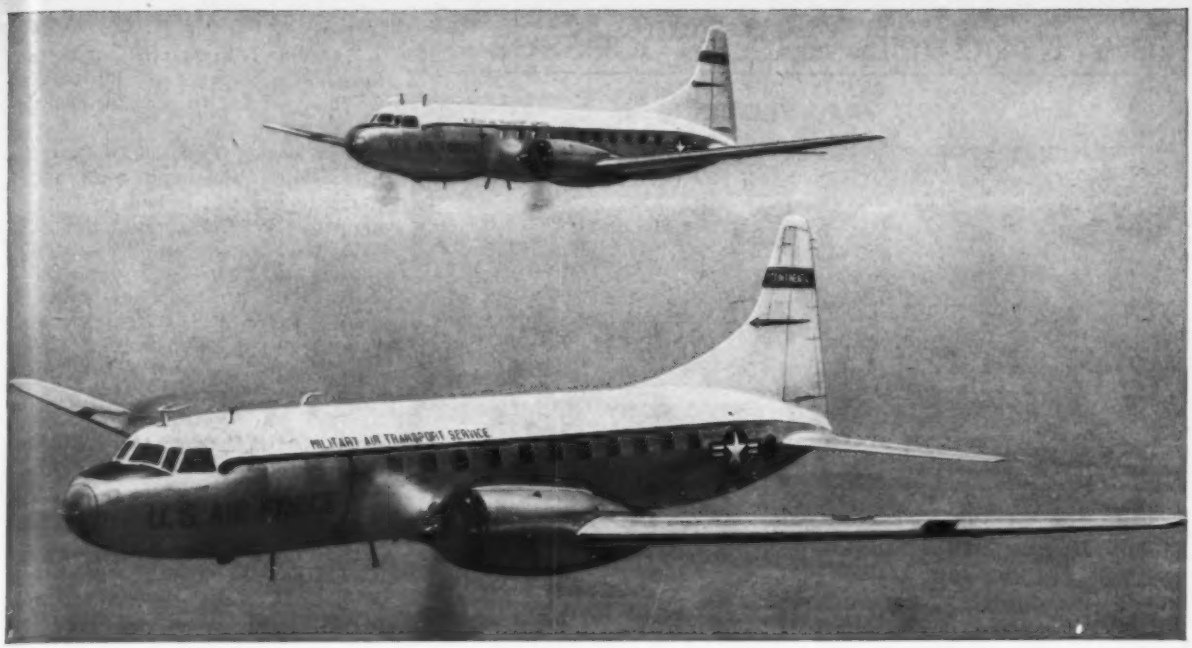
Antenna and Stabilizer



Synchronizer

Receiver Transmitter

First pictures of Collins Radio Co.'s WP-101 C-band weather-mapping radar, part of $1.5 million Collins equipment that has been purchased by Delta Airlines, Inc. for its fleet. Both the receiver-transmitter and synchronizer units are 1 ATR size. Total weight of the system is 131.3 pounds. Antenna diameter is 21 inches. Magnetic amplifiers, printed wiring and modular construction are used. Power requirement is 115 volts ac, 380-420 cps, 700 volt-amperes maximum and 28 volts dc, 1 ampere maximum.




# MATS Beats Flight Program Schedule with Allison Turbo-Prop Engines and Aeroproducts Propellers

To MATS' 1700th Test Squadron – Congratulations for a good job well done.

This month, the final hour will be flown on a program which has as its target 3000 flight hours by January 30, 1956 on two Convair YC-131C aircraft powered with Allison Turbo-Prop engines and Aeroproducts Propellers. The program will be completed more than 30 days ahead of schedule – thanks to the skill and enthusiasm of the pilots and crews who were given the job to do.

The aircraft were delivered to MATS at Kelly AFB, San Antonio, Texas, in January, 1955. The 1700th Test Squadron had just been activated and was composed of men who not only were outstanding in their abilities but who demonstrated a genuine enthusiasm for Turbo-Prop transports in military aviation.

Colonel Claude Smith, Commander 1700th Air Transport Group, and his staff immediately initiated a familiarization program for all personnel and the entire squadron set out to obtain maximum time on the two aircraft. The object was to prove the place of turbo-prop-powered transport in military aviation.

Hours on the aircraft mounted rapidly. Sometimes the planes shuttled between Kelly AFB and Travis AFB, or to Andrews, or to the Allison plants in Indianapolis. And many days went by with pilots making operational flights over Texas. Three and four flights a day with five hours per flight became routine. And in one 24-hour period, each aircraft was kept in the air for 23 hours and 10 minutes.

It was long, hard work for pilots in the air and crews on the ground. But they kept at it – determined not only to beat their schedule but to demonstrate convincingly to others the firm, determined faith they have in the future of turbo-prop power.

Under Lt. Col. Samuel C. Burgess, Commander, the work of the 1700th Test Squadron will continue with other aircraft powered with turbo-prop engines. But the pioneering phase of the program is concluding. The rest of the program has been aided immeasurably by the experience gained with the first aircraft assigned to the project.

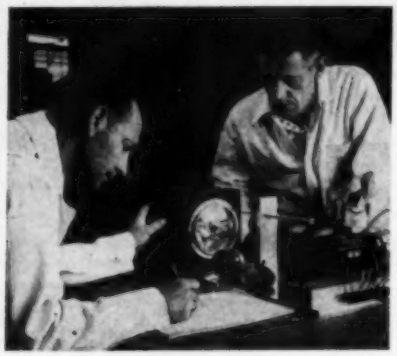
We at Allison salute the good work of the men of the 1700th Test Squadron. We are proud to have been part of the project. You have proved that turbo-prop engines and propellers are "ready to go" and we are gratified that the convincing demonstration was made with Allison Turbo-Prop engines and Aeroproducts Propellers.

**Allison Division of General Motors**
**Indianapolis, Indiana**

# New Products and Processes

## TWO VARD PRODUCTS

Magneto-Distributor



Magnetic Clutch

**Vard, Inc.** has developed two new products, a magneto-distributor and a magnetic clutch.

The manufacturer believes that the magneto-distributor provides a more reliable ignition system for high altitude aircraft than others now in use. Components include an alternator, triggering section, condenser and high-tension coil. Triggering section replaces the breaker points in a conventional magneto through an electronic triggering circuit that is energized by the peak voltage of the alternator.

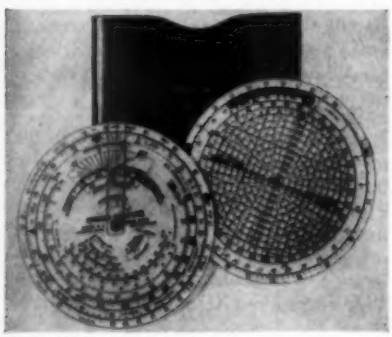
Advantages of such a unit are said to include: elimination of breaker point wear or gap variation, no point bounce due to high speed, no point arcing due to altitude and less radio interference due to point sparking.

The magnetic clutch has wide application in the servo-mechanism field, including autopilots. It depends on a magnetically induced torque for its operation.

The clutch functions as a torque transmitting device. It can be controlled externally with an applied dc excitation that requires 5% of the power being transmitted at any nominal speed.

**Circle No. 161 on Reader Service Card.**

## FLIGHT COMPUTER



**Jeppesen & Co.** has announced development of a new air navigation computer, the Model R-2, which features new methods of calculating wind conditions and more accurately determining true airspeed. It already has been adopted officially by United and Continental Air Lines.

The new R-2 "wind solution" is a visual presentation resulting from a development by United pilot Ray Lahr. Applied to the computer it tells a pilot whether a tail or headwind component exists, its force in miles per hour or knots, and whether a crab angle is left or right, in degrees.

Improved means of calculating true airspeed, a development of Franz J. A. Huber, take into account the inherent error in aircraft outside air temperature readings due to skin friction and compressibility effects. At 20,000 feet altitude, — 30°C and 270 knots indicated speed, the R-2 method is said to give a true airspeed result of 350 knots compared with 365 knots by conventional calculations—a 15-knot increase in accuracy.

The R-2 is available in 4¼" (pocket), 6" (navigator) and 30" (classroom) sizes.

**Circle No. 171 on Reader Service Card.**

## PIPE ELBOW, MOLDED BELLOWS

Two new products introduced by **Resistoflex Corp.** are the Fluoroflex-T pipe elbow and the Fluoroflex T1001 molded bellows. Both are made from chemically inert fluorocarbon resins.

The pipe elbow is available in both 45° and 90° types. It is designed for use with Fluoroflex-T laminated pipe or any ASA flanged piping.

The molded bellows and expansion joint may be obtained in diameters of 1, 1½, 2 and 3 in.

**Circle No. 150 on Reader Service Card.**

## VHF ANTENNA

**Electronics Equipment Engineering, Inc.** offers a stainless steel VHF antenna, weighing 1.5 lbs, designed for moderate speed aircraft.

Designated Type 200, the antenna has a heavy aluminum cover and a connector box that is said to eliminate the possibility of electrical shorting. The base insulator is of linen bakelite, vacuum-impregnated. The antenna is designed for operations in the 166 to 136-mc range. Its electrical connector permits use of any standard 52-ohm coaxial cable.

**Circle No. 164 on Reader Service Card.**

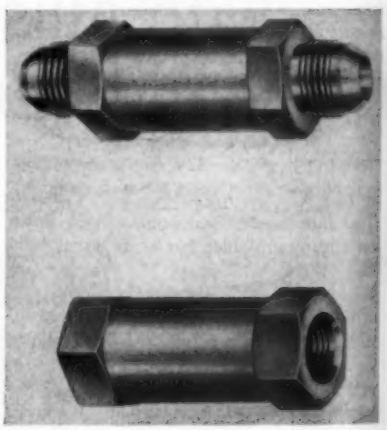
## MINIATURE COAXIAL CABLES

A new line of miniature coaxial cables, available in three standard types (50-ohm, 70-ohm and 93-ohm), has been introduced by **Hitemp Wires, Inc.**

Each type of cable may be obtained with an outer covering of vinyl, nylon, Kel-F, Teflon or a glass-fibre braid. All are Teflon-insulated. Special low-noise types are also available.

**Circle No. 163 on Reader Service Card.**

## CHECK VALVES



**Aircraft Products Co.** has developed what it believes to be the first AN-approved ½ in. aluminum alloy check valves for 3,000 psi hydraulic service. Weight-saving factor over conventional check valves is said to be 55%.

Two models are available. Model 1008 has external threaded ends and meets government requirements for AN 6249-8 and AN 6207-8. Model 1058, with internal threaded ends, meets requirements for AN 6280-8. Both models have an ambient temperature range of —65°F to 160°F.

For higher temperature ranges, the valves can be supplied with seals for 275°F service. Other valves for lower pressures are also available.

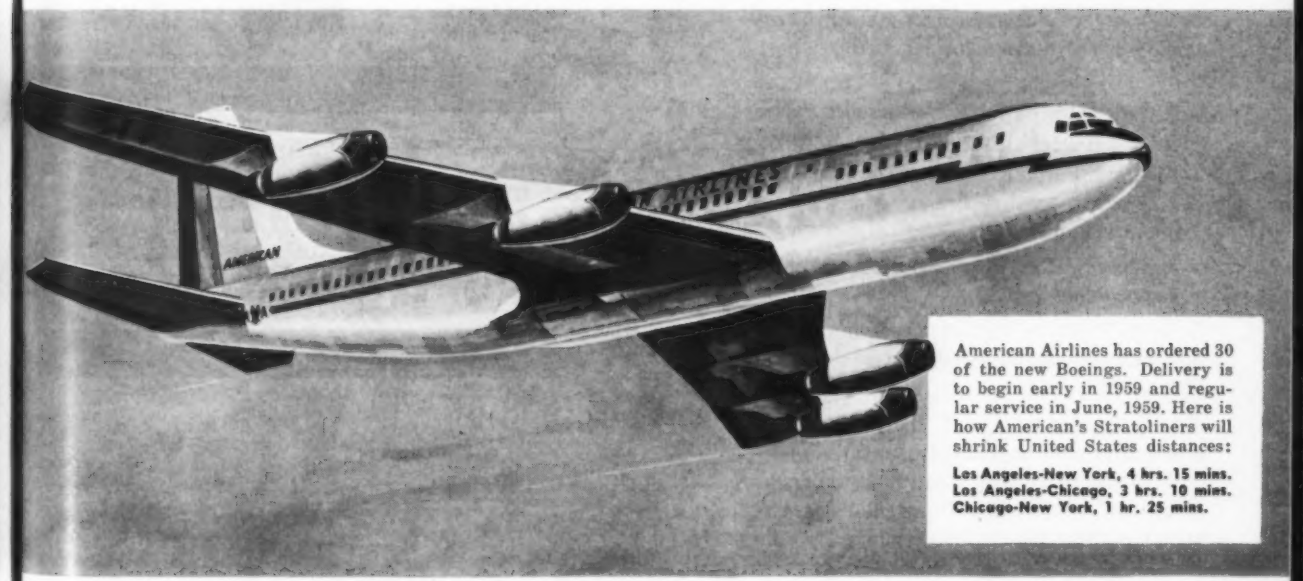
**Circle No. 156 on Reader Service Card.**

(*Continued on page* 53)

Pan American World Airways has ordered 20 Boeing 707 Stratoliners, for delivery late in 1958, and scheduled service the following spring. Here are some of the proposed flight times:

**New York-Paris, 6 hrs. 35 mins.**
**Chicago-London, 6 hrs. 45 mins.**
**San Francisco-Tokyo, 12 hrs. 45 mins.**
**N. Y.-Buenos Aires, 11 hrs. 15 mins.**

# FIRST jet transocean service!




American Airlines has ordered 30 of the new Boeings. Delivery is to begin early in 1959 and regular service in June, 1959. Here is how American's Stratoliners will shrink United States distances:

**Los Angeles-New York, 4 hrs. 15 mins.**
**Los Angeles-Chicago, 3 hrs. 10 mins.**
**Chicago-New York, 1 hr. 25 mins.**

# FIRST jet transcontinental service!

There is only one *first* jet transport in America. It is the Boeing Stratoliner—an airplane with brilliant performance that has already been proved in more than a year of flight-testing. On a recent routine test flight, the Boeing Jet made history by flying from coast to coast *and back* in 8 hours and 6 minutes!

You will be flying in Boeing jet airliners *first* because Boeing was the one manufacturer with the faith and foresight to build a prototype—the "707"—with its own funds.

Behind the Stratoliner is 39 years of leadership in aviation—20 years of building high-altitude pressurized planes—and finally the vast experience Boeing has gained in producing and flying more big multi-jet, high-altitude aircraft than any other company in the world.

# BOEING Jet Stratoliner

Some new

ideas in

# PNEUMATIC CONTROLS FOR JET AIRCRAFT

Years of experience in the control of high pressure, high temperature air in critical combustion processes provided the basis for development of Janitrol's new line of air pressure controls.

Here are five typical Janitrol controls "with the new approach":

**1**–Canopy seal regulator, mechanically actuated by canopy movement. An auxiliary port is provided for other uses.

**2**–Pylon Tank Regulator with relief valve, maintains constant pressure for fuel transfer.

**3**–General Purpose Regulator for canopy seal or other uses. Operates with separate solenoid shutoff valve.

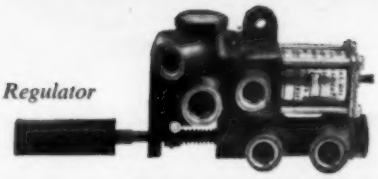
**4**–Canopy Seal Regulator with built in solenoid and relief valve.

**5**–High Pressure Regulator used in connection with thermal anti-icing system involving high air flow rates.

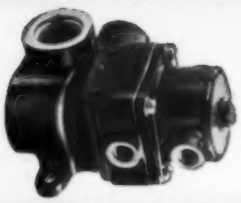
Applications of these and other controls are now performing dependably on various aircraft produced by such Janitrol customers as Grumman Aircraft Eng. Corp., Douglas Aircraft Co., Republic Aviation, Glenn L. Martin Co., A. V. Roe and others.

Consult your Janitrol district aircraft engineering representative for help with your pneumatic control problems.

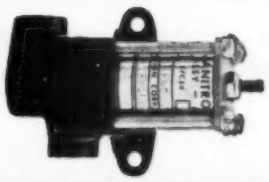
**1.** *Canopy Seal Regulator*



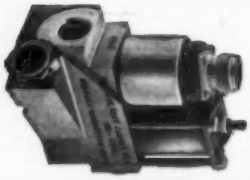
**2.** *Pylon Tank Regulator*



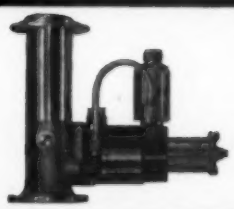
**3.** *General Purpose Regulator*



**4.** *Canopy Seal Regulator*



**5.** *High Pressure Regulator*



**Janitrol**

**AIRCRAFT-AUTOMOTIVE DIVISION, SURFACE COMBUSTION CORPORATION, COLUMBUS 16, OHIO**

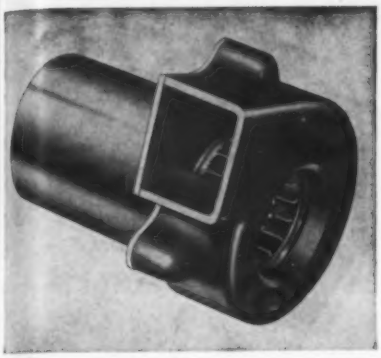
DISTRICT ENGINEERING OFFICES: NEW YORK, 225 BROADWAY; WASHINGTON, D. C., 4650 EAST-WEST HIGHWAY; KANSAS CITY, 2201 GRAND AVE.; FORT WORTH, 2509 BERRY ST.; HOLLYWOOD, CALIF., 7046 HOLLYWOOD BLVD.; COLUMBUS, OHIO, 400 DUBLIN AVE.

Circle No. 18 on Reader Service Card.

## NEW PRODUCTS

(*Continued from page* 50)

### FANS AND BLOWERS



Propeller fans and centrifugal blowers have been added to the line of rotating electrical equipment made by the **Hertner Electric Co.**, which has been expanding its activities in the small motors field.

Shown here is a centrifugal blower designed to meet rigid airborne electronic equipment requirements, according to the manufacturer. It is particularly applicable for operation at 400 cycles, 115 volts, single phase. Designs for operation at 2 to 1,600 cycles, as well as variable frequency motors, are also available.

**Circle No. 162 on Reader Service Card.**

### PERMANENT-MAGNET MOTOR

A new line of dc motors incorporating a permanent-magnet field assembly has been introduced by **Servo-Tek Products Co.** Overall length is less than 1½ in. and weight less than 3 oz.

Housing for the motors is machined from solid aluminum. They have low-torque ball bearings, an anodized finish and improved mechanical construction, according to the manufacturer.

Various electrical characteristics are available, with a range of operating voltages from 6 to 80, no load speeds from 3,000 to 20,000 rpm and power output up to 11 watts, or approximately 1/70 hp.

**Circle No. 148 on Reader Service Card.**

### MINIATURE CLUTCH

**Precision Specialties** has introduced a new line of miniature clutches featuring a displacement drive that will transmit up to 10 inch-pounds of torque at speeds up to 1,800 rpm without requiring external lubrication.

These clutches are available in four basic types: single-revolution, overrunning, non-reversing and indexing. Sleeve-end and through-shaft mounts are available in these four types. They are said to be useful in servo-mechanisms, computer devices and allied types of equipment.

**Circle No. 149 on Reader Service Card.**

### MINIATURE SOLENOID

**PSP Engineering Co.** has developed a miniature solenoid that delivers high actuating force at short stroke and low voltage. It measures 1¼ in. high, including threaded connection, and ¾ in. in diameter.

The size and weight of the solenoid make it ideal for use in computers, memory units, gyroscopes, indicators, with valve systems, and in other electronic systems requiring short stroke and extreme control accuracy.

Designated Model SD328, the solenoid delivers 4.5 lbs. at .020 in. stroke at 18 volts dc and 6.5 lbs. at .020 in. when operating on 24 volts dc. It is designed for continuous duty at 18 to 30 volts.

**Circle No. 153 on Reader Service Card.**

(*Continued on page* 55)


Capital Airlines

VISCOUNT

POWERED BY ROLLS-ROYCE

ROLLS RR ROYCE

*The Vickers Viscount is manufactured by Vickers Armstrongs Limited*

**ROLLS-ROYCE AERO ENGINES FOR SPEED AND RELIABILITY**

ROLLS-ROYCE LIMITED · DERBY · ENGLAND

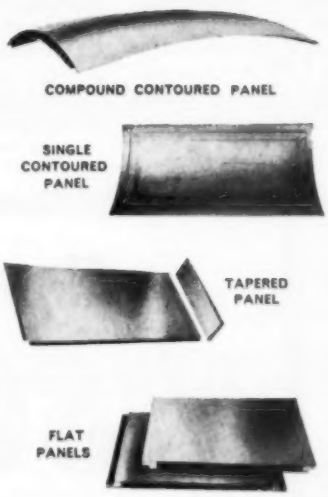
# ROHR

**IS THE WORLD'S LARGEST PRODUCER OF READY-TO-INSTALL POWER PACKAGES FOR AIRPLANES**

*but that's only part of the Rohr Story*

. . . for in addition to being famous for Power Packages, Rohr builds over 30,000 other different aircraft parts of all kinds for many of America's great commercial and military aircraft.

For example, to meet the demands for high-strength, light-weight, heat-resistant material for which aircraft designers are searching, ROHR is developing all-metal, honeycomb, sandwich structures.



**When you want aircraft parts better, faster, cheaper . . . call on Rohr and the Rohr engineering skill and production know-how gained from building thousands of power packages and millions of other aircraft parts.**

**ROHR**
AIRCRAFT CORPORATION

CHULA VISTA AND RIVERSIDE CALIFORNIA

## NEW PRODUCTS

(*Continued from page 53*)

### ROTARY SWITCHES

A new line of small, lightweight rotary sampling switches with dc motor drives has been announced by the **Applied Science Corp. of Princeton.** They are for use in airborne and general instrumentation applications.

Switches are available with 1, 2, 3 or 4 poles containing 24, 30 or 32 shorting contacts per pole. Phasing between poles can be manually adjusted while the switches are in operation. Motor voltages of 6, 12, or 27.5 volts dc, with sampling speeds from 0.1 to 10 rps, are available.

**Circle No. 160 on Reader Service Card.**

### PURGING SYSTEM VALVES

Resistance Flow Valve

Pressure Regulating Valve

Two aircraft purging system valves with a combined weight of 4.09 lbs. are offered by **United Aircraft Products, Inc.**

Resistance flow Valve U-512740, weighing .78 lb., maintains a constant pressure drop of 7 in. of water when the inlet pressure fluctuates between 14 and 17 in. Flow capacity is 5 lbs. of gas per min. maximum with gas temperature of 160°F and pressure of 14.7 psia.

Pressure regulating valve U-516080-1, weighing 3.31 lbs., controls gas pressure at the outlet side when pressure at the inlet side varies from 10 in. hg. to 60 in. hg. gauge. Flow capacity is 10 lbs. of gas per min. maximum with gas temperature of 160°F and pressure of 14.7 psia.

**Circle No. 155 on Reader Service Card.**

(*Continued on next page*)

Combines For the First Time

**Pantobase**

(All Bases)

*and*

**BLC**

(Boundary Layer Control)

It is with pride that Stroukoff Aircraft is producing for the United States Air Force the most efficient advanced assault air transport in the history of military aviation.

This development combines slow landing speeds through means of the Boundary Layer Control system, and includes the Pantobase installation, both designed by Stroukoff Aircraft Corporation.

The MS-8-1 is able to land and take-off from unprepared surfaces such as rough terrain, sand, snow, ice, ordinary runways and to operate from water as well. It will do so at low speeds never before possible with aircraft of its weight; and in half the area needed by its prototypes.

STROUKOFF AVITRUC

Stroukoff Aircraft Corporation

WEST TRENTON NEW JERSEY

**Circle No. 19 on Reader Service Card.**

WHO IS THIS MAN —AND WHAT IS HE DOING?

WHOSE ARE THESE—AND WHY?

**Keep tuned to your favorite aviation magazines for the next 12 months and find out!** Yes, in response to pleas . . . and please . . . from every corner of the world, we will continue our Public Service Type Advertising Program in January. The only thing we ask in return is that YOU remember US for service and factory-new parts.

**Southwest Airmotive** COMPANY LOVE FIELD DALLAS

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"We've got royalty aboard every

Golden DC-7 Crown flight"

passengers wear the crown between —

CHICAGO • ATLANTA • MIAMI
HOUSTON • ST. LOUIS • CHICAGO
MIAMI • JACKSONVILLE • CINCINNATI
DALLAS • NEW ORLEANS • ATLANTA
CHICAGO • NEW ORLEANS • CARIBBEAN
MIAMI • DALLAS • LOS ANGELES*

*Delta-National-American Interchange

Delta AIR LINES

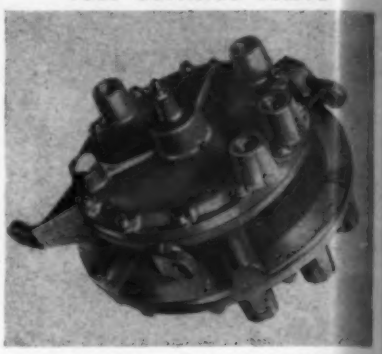
Formerly Operating as Delta C&S

General Offices: Atlanta Airport, Atlanta, Ga.


## NEW PRODUCTS

(*Continued from page* 55)

### FUEL CONTROL VALVE



**Parker Aircraft Co.** is producing a hydro-mechanical fuel balance system that holds the center of gravity within 1% MAC (mean aerodynamic chord), through accurate automatic sequencing of fuel tanks widely dispersed from the cg.

In the Parker system a control unit senses absolute fuel head in forward and aft tanks and feeds these heads into opposing diaphragm chambers at opposite ends of a control valve. This valve, in turn, operates a shut-off valve between the tanks.

Desired fuel head difference is said to be held to ± ½ in. over the complete range of flows, temperatures and flight altitudes up to 20° climb or dive.

Grumman Aircraft Engineering Corp. is using the Parker system on its new F11F-1.

Circle No. 157 on Reader Service Card.

### CUSHIONED CLAMPS

**Adel Precision Products,** a division of **General Metals Corp.,** offers a silicone-impregnated Fiberglas clamp said to be able to withstand the sub-zero cold of the stratosphere and the intense heat of aircraft, missile and rocket powerplants.

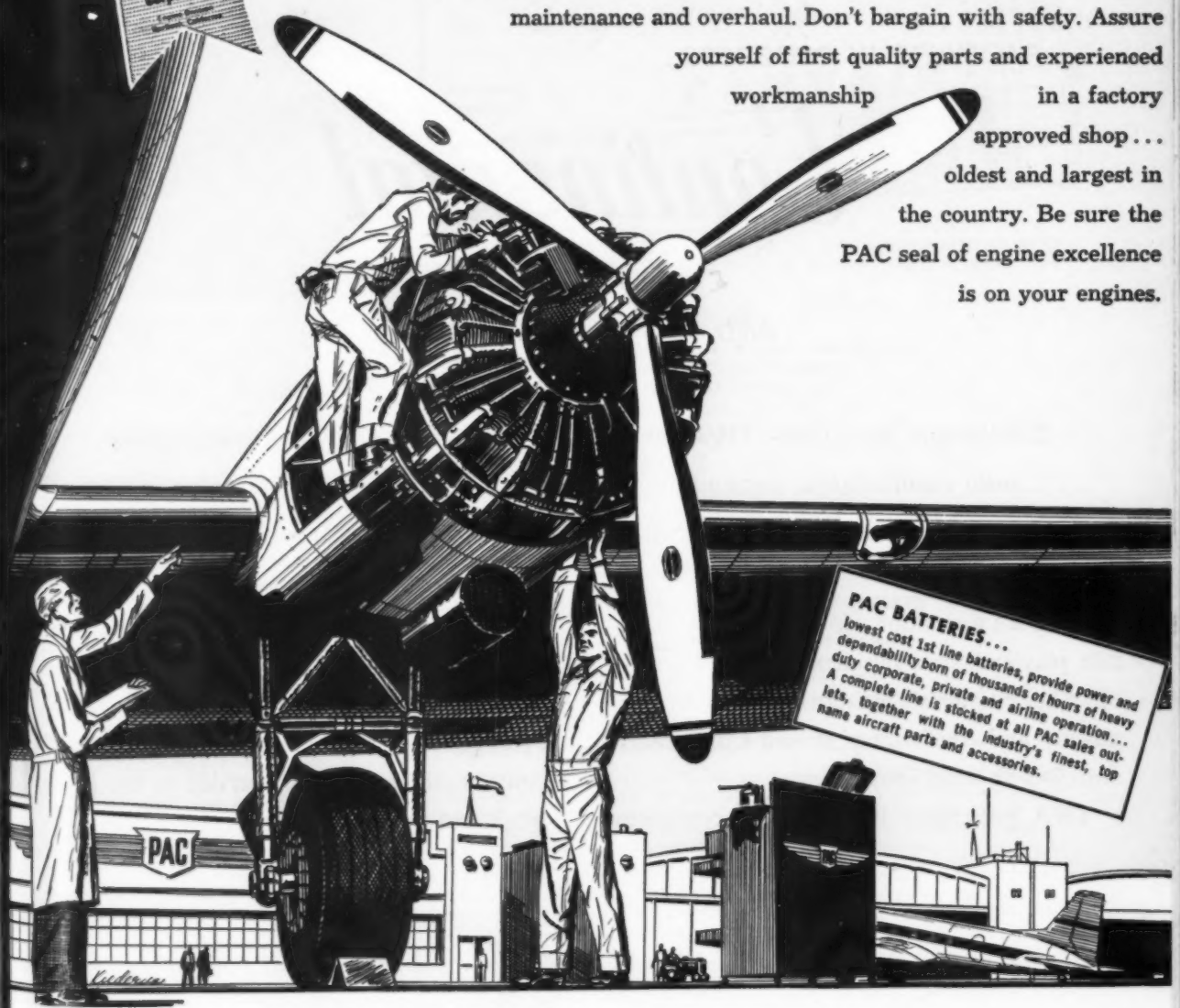
Designated No. 82626, these cushioned clamps are available in a wide assortment of sizes. Temperature characteristics range from below —90°F to

(*Continued on page* 59)

# WARRANTY

## *of engine excellence...*

**THIS SEAL ON YOUR ENGINE MEANS DOLLARS IN YOUR POCKET** —PAC reliability has improved average operating time for all aircraft operators... business, private, or airline... who have relied consistently upon PAC engine maintenance and overhaul. Don't bargain with safety. Assure yourself of first quality parts and experienced workmanship in a factory approved shop... oldest and largest in the country. Be sure the PAC seal of engine excellence is on your engines.


PAC
Pacific Airmotive Corporation
PAC BATTERIES...
lowest cost 1st line batteries, provide power and dependability born of thousands of hours of heavy duty corporate, private and airline operation... A complete line is stocked at all PAC sales outlets, together with the industry's finest, top name aircraft parts and accessories.
PAC

**ONE STOP SERVICE**

Major Overhaul and Modification...custom interiors • instrument panels • radio installation • hydraulic and electrical systems • tank seal • painting, storage and gas service • One of the nation's most completely equipped facilities for maintenance, overhaul and modification of aircraft.

**AERO PNEUMATICS**

Manufacturers of Cabin Pressurization and Low Pressure Pneumatic Equipment...cabin pressure regulators • safety valves • shut-off and modulating valves • flow controllers • pneumatic power pressure regulators • Aero Pneumatics Div., Burbank, Calif. or Russell Associates, Brightwaters, L.I., N.Y.

**TEST & GROUND HANDLING EQUIPMENT**

Manufacturers of a Complete Line of Test and Ground Handling Equipment...portable hydraulic test stands • hydraulic test benches • magneto and propeller test stands • "tilt-arc" engine handling units • Fully staffed and equipped to design and manufacture specialized high capacity equipment to customer requirements.

**WRITE, WIRE OR PHONE TODAY FOR COMPLETE INFORMATION.**

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**COLORADO** Denver
**NEW JERSEY** Linden

# PACIFIC AIRMOTIVE CORPORATION

2940 No. Hollywood Way, Burbank, Calif.

Circle No. 21 on Reader Service Card.

*PARTNERS IN PROGRESS . . .*

# *Continental*

## AND TWA

***Continental Air Lines—TWA interline partner—provides TWA passengers with comfortable, dependable service to the Colorado vacationlands and between 54 communities in 6 western states!***

Whether it's a vacation trip to the Rocky Mountain playland, or a business trip to Denver or other key cities in six western states, you're there quickly and comfortably aboard Continental's swift DC-6's and Convairs.

TWA passengers have enjoyed convenient service to these areas through the interline partnership with Continental, with direct connections at Kansas City, Albuquerque, and Amarillo. As TWA celebrates its 30th year of service, it hails Continental's outstanding service to the flying public and the airline industry.

*Fly the finest...* **FLY TWA**

**TRANS WORLD AIRLINES**

**U.S.A. • EUROPE • AFRICA • ASIA**

## NEW PRODUCTS

(*Continued from page* 56)

above 550°F. According to the maker, the cushions do not tear during engine harness assemblies. If the material chars as a result of extremely high temperatures, a safe, non-conductive layer still provides protection.

**Circle No. 154 on Reader Service Card.**

### ALUMINUM ALLOY TRACK

A lightweight, high-strength 75S-T aluminum track, and component fittings capable of handling 12G loads have been developed by the **Brown-Line Corp.**

The track is designed specifically for high-density seating modifications, galley installations, bunks, litter conversions, cargo tie-down and partitioning. It is said to effect a 20% weight reduction over previous installations.

A complete line of component fittings, such as tie-down rings, seat, strap and galley fittings are available in either a locked position or a free-floating type.

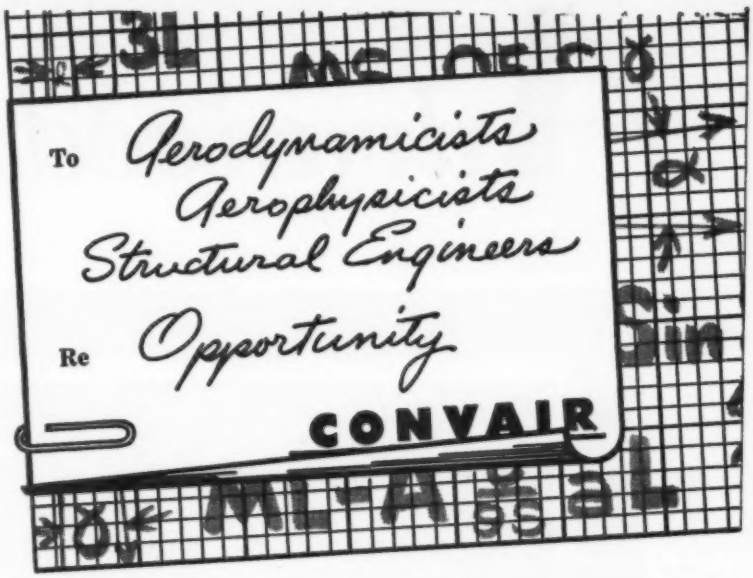
**Circle No. 151 on Reader Service Card.**

### SELF-SEALING FASTENERS

An assortment of self-sealing fasteners designed so the mating surface is sealed to the head of the threaded fastener is offered by the **Aero Bolt & Screw Co., Inc.** The sealing is accomplished by the use of an AN or MS "O" ring nestled in an "O" ring groove in the head of the bolt.

The fasteners are said to be reusable many times. A thin teflon washer

(*Continued on page* 63)


**There is an important place for you at CONVAIR-FORT WORTH if you have the qualifications and desire to perform vitally essential work in these technical areas.**

**AERODYNAMICS**

**Lift and Drag Prediction of Aircraft and Missiles—**
**Aerodynamic Loads—Wind Tunnel Testing—**
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**Cruise Control**
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**Stress and Deflection Analyses—Materials Research and Development—Preliminary Design—**
**Aerodynamics of Steady and Non Steady Flow—**
**Flutter Model Design—Electronic Computer Programming—**
**Fatigue Problems**

**Attractive openings also exist in other technical areas.**

**As a division of General Dynamics Corporation, CONVAIR occupies an important place in the long-range development of the Nation's aerial defense as well as commercial aviation. CONVAIR'S activities afford inviting career opportunities for engineers, physicists and scientists — opportunities for professional accomplishment and personal income.**

**At CONVAIR-FORT WORTH you work in ideal, air-conditioned surroundings. A company-sponsored, in-plant program enables candidates to earn graduate degrees in Engineering. CONVAIR offers liberal travel allowance, paid vacations, excellent insurance and retirement programs.**

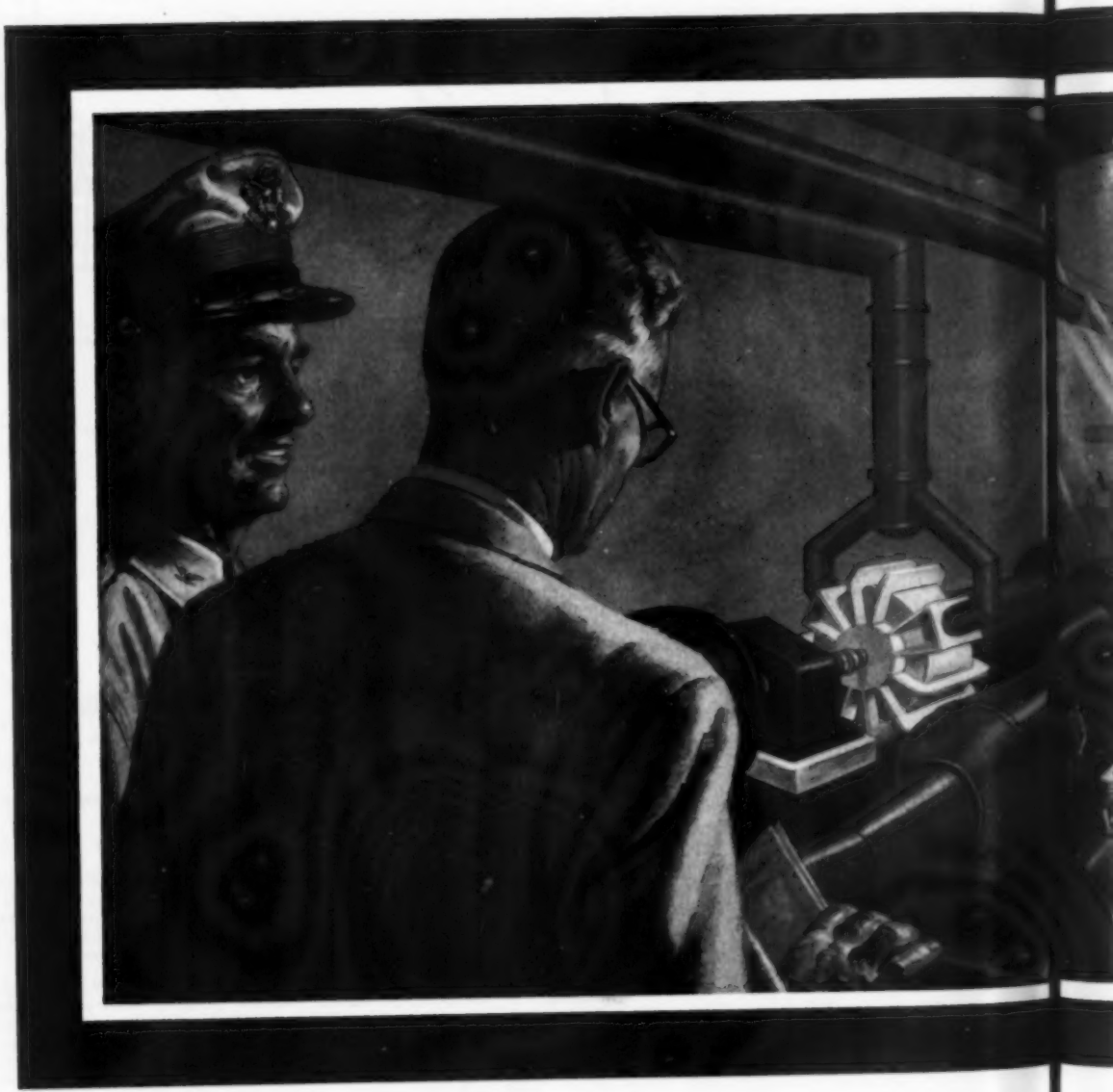
**Fort Worth in the Great Southwest has an abundance of sunshine and dry, fresh air conducive to outdoor living and recreation. Within a few minutes drive of Fort Worth are seven large lakes which provide ample facilities for fishing and other water sports.**

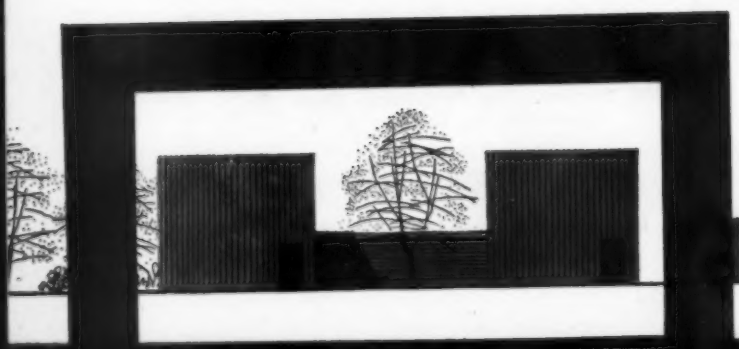
**For further details write M. L. TAYLOR**
**CONVAIR Engineering Personnel Dept YY**
**Fort Worth, Texas**

CONVAIR
FORT WORTH

**CONVAIR**
**A DIVISION OF GENERAL DYNAMICS CORPORATION**
**FORT WORTH, TEXAS**

# *Advanced turbine re*





# e research laboratory

Power is basic to America's future in the air. Whether for small executive aircraft, short or long haul jet transports, fighters, trainers, missiles or other air weapons for free world defense . . . development of new powerplants sets the pace for progress.

Fairchild has taken the lead in the development of the small turbo-jet engine. An entirely new jet engine family has been created in its J44 . . . a package of power delivering higher thrust per pound weight.

Late this year, Fairchild Engine Division's new Turbine Research Lab will be completed and ready for action, armed with the newest engineering and manufacturing facilities and ready to serve America's best interests.

From its small beginning at Farmingdale, L. I. in 1928, Fairchild Engine Division's record has been one of constant growth and progress. This new facility, completely integrated for the latest powerplant manufacture, may be counted on in 1955 and the years to come to continue, as always, with *more power* with *less weight* in *smaller engines* to advance tomorrow's military and commercial aviation progress.

ENGINE AND AIRPLANE CORPORATION

**FAIRCHILD**

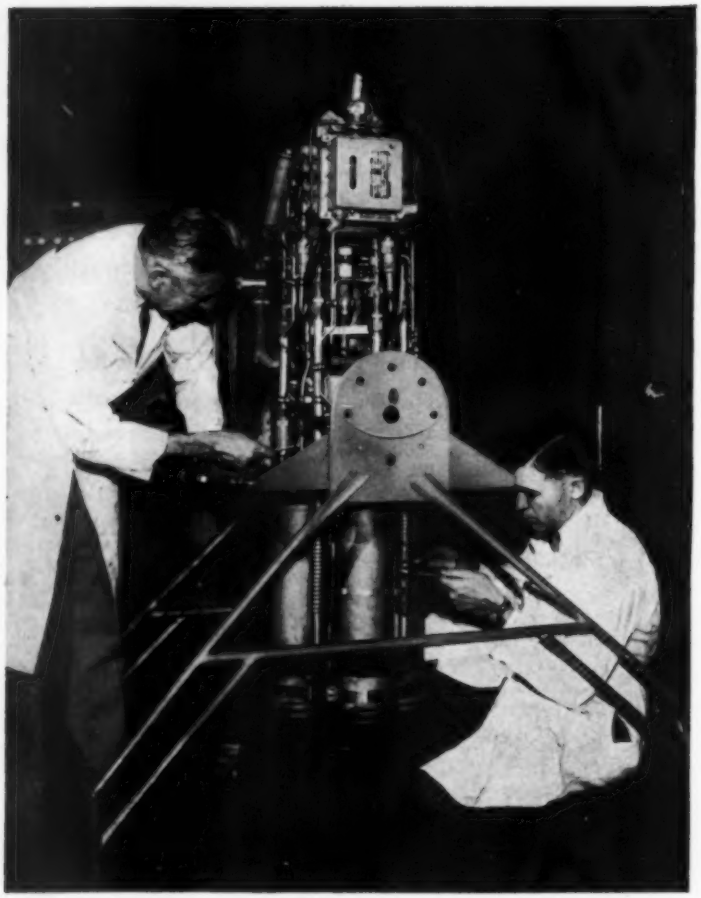
*Engine Division**

DEER PARK, LONG ISLAND, NEW YORK

* Including AL-FIN, the Fairchild patented process for the molecular

"where the future is geared to higher ways"

**NEW TEAM IMPETUS...**



# *adds power to rocket propulsion*

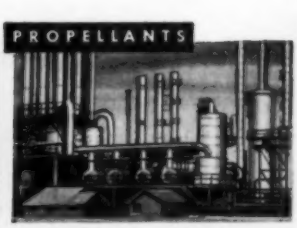
Now, the modern "weapons system" concept is applied to the development and production of rockets, ramjets, and special liquid and solid propellants. Reaction Motors, Marquardt Aircraft, and Olin Mathieson Chemical combine for the first time as part of an integrated plan both chemical and mechanical experience applicable to high-energy power generation. Coordinated by the OMAR Joint Technical Committee comprised of representatives of the three companies, this applied research program is dedicated to the practical advancement of supersonic aircraft and missile propulsion.

**First in the American rocket industry,** Reaction Motors develops and builds powerplants such as the one above that set a new piloted-aircraft speed record of over 1600 mph in the Air Force Bell X-1A. Working with Marquardt Aircraft and Olin Mathieson Chemical, RMI contributes to a continuous joint technical program to achieve improved rocket and ramjet engines and special fuels.

RAMJETS

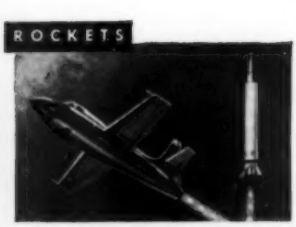
Marquardt Aircraft Company

PROPELLANTS



Olin Mathieson Chemical Corporation

ROCKETS



Reaction Motors, Inc.

MARQUARDT AIRCRAFT
OLIN MATHIESON CHEMICAL
REACTION MOTORS

3537



Circle No. 22 on Reader Service Card.

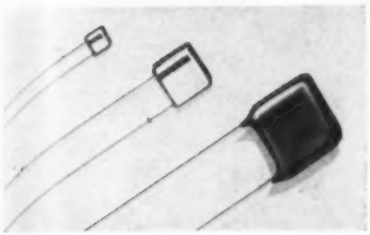
## NEW PRODUCTS

(*Continued from page* 59)

placed between the "O" ring and the head of the fastener eliminates friction and allows the rubber to flow evenly in all directions.

**Circle No. 152 on Reader Service Card.**

### THERMISTORS



A series of wafer-type thermistors is available from the **Thermistor Corp. of America.** They are stocked in a complete range of resistances from ohms to megohms, and are available with high temperature coefficients that run up to 7% per degree centigrade at room temperature in high resistance values.

Sample resistors may be obtained in any resistance value for design and development studies. A waxed phenolic coating for insulation and moisture proofing is optional.

**Circle No. 159 on Reader Service Card.**

### TRANSISTOR CURVE TRACER

Two models, No. 126 and 126S, of a PNP-NPN transistor curve tracer have been announced by **American Electronics Laboratories, Inc.** Offering wide voltage and current ranges, oscilloscope switching and various outputs to any terminal of the transistor under test, sweep current to 600 ma is available in standard models, with 3 amperes range provided optionally. There are seven constant current steps up to 20 ma per step. Internal calibration and Z-axis blanking are available.

Model 126 is enclosed in a desk panel rack without oscilloscope. Model 126S is supplied with an oscilloscope in an open table-type relay rack.

**Circle No. 172 on Reader Service Card.**

# No Flat Spots, says Hy Trol

Let's get away from contemplation of the fuselage a minute. You'll probably hate us for it, but we want to discuss the one thing that dame doesn't have—airplane tires.

You just don't get flat spots on tires when Hy Trol's around. In one year's scheduled airline operation, the record showed that Hy Trol saved 50 premature tire removals for this cause on aircraft that relied on Hy Trol consistently during landings. (Northwest Orient, 1953).

Worth thinking about? O.K., now you've thought about it you can go back to your study of the streamlined shape.

***hytrol***
**is Standard Equipment on:**
B-47, B-52, A3D, RB-66, RF-84F, F-100, C-130, QF-80
**Installed on** DC-4, DC-6, DC-7, DC-7B, C-46, C-54, C-97, C-118A, B-377, R5D, R6D, P2V-5, Avro Jetliner, F9F, F-80, F-84F, F-89, F-94, F-101A, B-36G, YB-60

***hytrol***
**the *accepted* Anti-skid Braking System**

*a product of*

HYDRO-AIRE *Inc., who also make*
HOT AIR VALVES • FUEL VALVES
TURBO MACHINERY • HY V/L PUMPS

BURBANK, CALIFORNIA • *Aviation Subsidiary of* CRANE CO.

**Circle No. 14 on Reader Service Card.**

70% OF THE WORLD IS A POTENTIAL BASE FOR YOUR NEW AIR NAVY

# New Sea-Air Weapons

## to guard America's Freedom

***Faster-than-sound fighters and new attack carriers underline the nuclear-age importance of Your New Air Navy***

The dynamic new Chance Vought F8U-1 *Crusader* and far-ranging aircraft carriers add hard-striking strength to a proven concept . . . sea-air power. From the decks of carriers on the oceans of the world, Air Navy jets project tremendous power over wide areas, helping to insure control of the sea by the forces of freedom.

The *Crusader*, designed and built by Chance Vought Aircraft, gives Your New Air Navy the *fastest carrier-based fighter in the world today*. It is another example of modern-as-tomorrow weapons produced by Vought for the Navy . . . another example of armed might dedicated to peace and to the preservation of freedom.

NAVAL AVIATORS CHALLENGE THE JET FRONTIER
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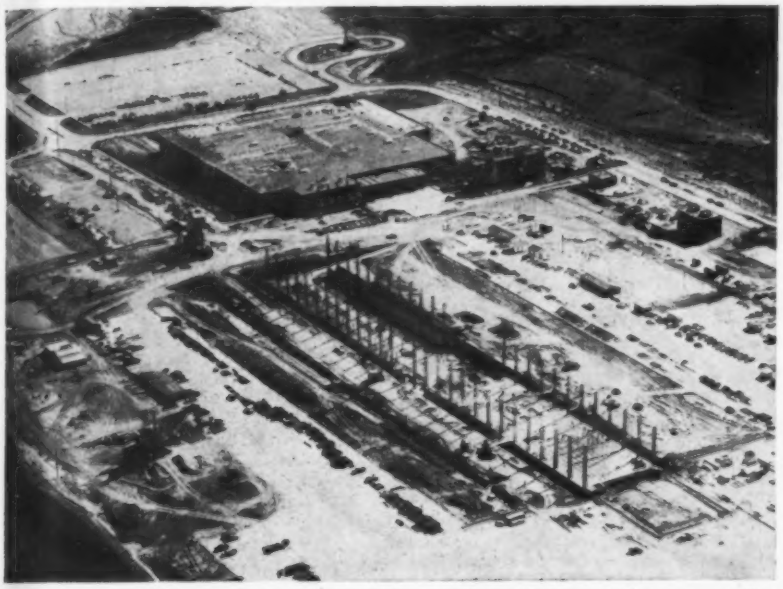
# TWA Overhaul Base Takes Shape



NEW TWA OVERHAUL BASE shown in this air view will be in full-scale operation January 1, 1957. Engine overhaul building (upper left) is slated to turn out first engine February 15, 1956, but hangar (foreground) isn't due for completion until next September.

Trans World Airlines' new $18.7-million overhaul facility at Mid-Continent International Airport in Platte County, Missouri (near Kansas City), is fast taking shape.

A separate engine overhaul building is due for completion December 23 and five new dynamometer-type engine tests cells are more than 50% complete. TWA expects to turn out the first engine to be overhauled at the new base as early as February 15, 1956.

Completion of the other major installation, a 1,011-ft. by 420-ft. aircraft hangar, is not due until September 1956. TWA target for full-scale operation in the engine overhaul and aircraft facilities is January 1, 1957.

# X-Ray Inspection Gains Popularity

X-ray inspection techniques have moved into the "big leagues" as an airline tool to speed aircraft maintenance and overhaul.

One by one, major carriers are forsaking the laborious process of removing inspection panels for periodic checks of hidden structure. In its place newly developed portable X-ray units are doing a more thorough inspection job, faster and at lower cost.

One of the better examples is at Trans World Airlines, Kansas City overhaul base, where more than 50 X-ray photographs are now taken of each Lockheed Constellation during overhaul inspection. TWA is using the lightweight Norelco X-ray unit produced by North American Philips Co. of New York City.

Present practice calls for use of X-ray to check the lower wing skin on earlier model Constellations—L-49, 749 and 749As. A Kodak industrial X-ray film Type A is inserted inside the fuel tank from the front to rear spar between Stations 131 to 145 and 191 to 205. The X-ray unit is centered about 24 inches from the film, with an exposure of about 1½ minutes.

TWA finds the 46-pound Norelco X-ray head is easily maneuverable near the fuselage, empennage and wing surfaces. It considers this portability of prime importance, since earlier experiments with heavier units proved them too cumbersome for full utilization in all areas.

## Stethoscope Detects Pressurization Leaks

Boeing Airplane Co. at Wichita has come up with a new slant on the detection of pressurization leaks in its production of high altitude bombers.

A small team of technicians in the sealing control section of its B-52 bomber production now employ stethoscopes, only slightly modified from their medical counterpart, to detect leakage in all pressurized compartments. Boeing experience is that these sensitive devices will detect even the most minute air fizz.

Stethoscope leak detection is an inside job—the technicians work within a pressurized area. The reason is that all leaks must be pinpointed at their source because, with pressure moving outward, several exterior leaks at points of least resistance might originate from a single inside source.

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But, new developments in aircraft make new demands on men. And, to help train the pilots who will fly this delta-winged jet in the defense of America, Link has developed the first F-102 jet flight simulator.

Months of research were necessary, but now, USAF pilots train on the ground in conditions precisely duplicating those of the plane's air performance. Electronically, the Link simulator re-creates all the actual flight characteristics of the F-102. Airmen will pilot a familiar craft when they first "hit the air" in this vital air-defense weapon.

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# People

## MANUFACTURING

**James R. Kerr** elected vice president of AVCO Manufacturing Corp.

**H. F. Penfold** appointed general sales mgr. of Rust Industrial Co., Inc.

**R. E. Lovejoy** named director of research for the counting and computing instrument division, Computer-Measurements Corp., No. Hollywood, Calif.

**James E. Lee** elected exec. vice president, United Aircraft Export Corp.; **Robt. B. Muir** and **Harvey Jolly** named vice presidents.

Whitehead

**Edward J. Lunney** appointed chief engineer in charge of reserach and analysis dept. of Barry Controls Incorporated.

**James E. Sullivan** named mgr. Washington offices of Lear, Incorporated.

**J. C. Garrett,** president of The Garrett Corp., elected chairman of the board; **W. C. Whitehead** elected president; **Richard E. Palmer** advanced to asst. mgr. of the AiResearch Mfg. division; **James F. Gardiner** named mgr. of contract administration.

**Russell B. McNeill** elected vp-administration, Houdaille Industries, Inc.

**C. L. (Chick) Davis** appointed manager of planning for the aeronautical division, Minneapolis-Honeywell Regulator Co.

**Wallace L. Jones** made president and **John E. Puhl** and **John W. McKee** appointed vice presidents of newly organized Flight Line Corp.

**Maj. Gen. Charles F. Born** (USAF, ret.), named director of service engineering, apparatus division, Texas Instruments, Inc.

**William J. Kuehl** named mgr. of communication and navigation sub-section; **Russell I. Mason** named mgr. of airborne early warning systems and sonar sub-section, and **Donald E. Uren** named mgr. of special project sub-section in the General Electric Light Military Electronic Equipment Department.

## AIRLINE

**Jack Brough** appointed vice president of Allied Maintenance Corp.

**D. W. H. MacKinnon,** vp-engineering and maintenance of Northeast Airlines, elected chairman of Air Transport Association Engineering and Maintenance Conference for 1956.

**James L. Dixon, Jr.,** appointed supt. of technical training for Braniff International Airways at Dallas.

**R. A. Kolb** named assistant to the traffic mgr. of the central region, Trans-Canada Air Lines, Toronto.

Thomson

**Alastair Thomson** appointed to newly created post of commercial manager for Seaboard & Western Airlines.

**Scott C. Whitney** made director of regulatory proceedings for Frontier Airlines.

**A. Leslie Valder** appointed British Overseas Airways Corp's sales manager for Scotland.

## GOVERNMENT

**Dr. Clifford C. Furnas** named Assistant Secretary of Defense (Research and Development).

## HONORED

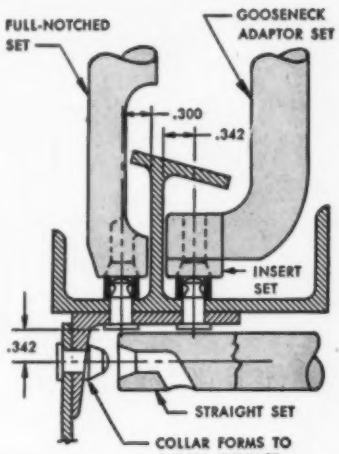
**George T. Hayes,** mgr. Washington Office of Stanford Research Institute, appointed chairman of executive committee, Aviation Division, American Society of Mechanical Engineers, for 1956.

## GD and Bristol Collaborate

General Dynamics Corp. and Bristol interests in England and Canada have organized a long-term plan of collaboration, starting with development and manufacture of a long-range turboprop transport. These men led a group of 25 in laying plans for the cooperative move. Seated, from left: Earl D. Johnson, General Dynamics' senior vp (operations and development); J. Geoffrey Notman, president and general manager of Canadair Ltd., a GD subsidiary; J. G. Zevely, Convair director of contracts, and Peter G. Masefield, recently designated managing director of Bristol Aircraft Ltd., England. Standing, from left: Adm. Lawrence B. Richardson, senior vp (engineering) of General Dynamics, and R. John Reynolds, executive vp of Bristol Aeroplane Co. of Canada Ltd.


# HERE'S A TOUGH PROBLEM OF ACCESSIBILITY

**for some fasteners but easily licked with HI-SHEARS!**




Above minimum layout dimensions are for ¼" diameter Hi-Shear rivet.

Because of its minimum protrusion, weight and tool clearance, the HI-SHEAR rivet is installed into critical space areas not accessible to other high strength fasteners.

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# NEW YORK AIRWAYS

## to double capacity with new

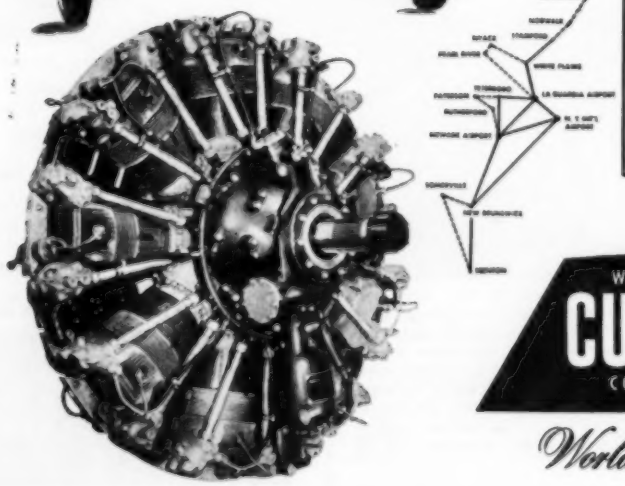
# Curtiss-Wright Cyclone 9-Powered SIKORSKY S-58 Helicopter Fleet

## Big "Sky Busses" to provide faster speeds, half-hourly schedules between Metropolitan airports

New York Airways will soon offer new half-hourly schedules between Idlewild, LaGuardia and Newark airports . . . and improved service over its arterial suburban routes. A new fleet of Sikorsky S-58 Helicopters, teamed with the powerful, dependable 1525 horsepower Curtiss-Wright Cyclone 9, will double NYA's present hourly schedule, up its capacity, lift power and cruising speeds . . . for more convenient passenger service and faster freighting.

New York Airways makes it possible for you to go "all the way by air"—interairport connections included—from any point on its schedule to any point serviced by any airline operating out of New York's metropolitan airports.

Powered by the Curtiss-Wright Cyclone 9, the new Sikorsky "sky busses" will be the largest helicopters on scheduled service in the world. This Curtiss-Wright engine is one of the most thoroughly proved aircraft powerplants in commercial operation. Over 113,000 Cyclone 9s have been built since the original model was developed. The specific Cyclone 9 model selected by New York Airways is specially engineered for helicopter operation.



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# West Coast Talk . . . By Fred S. Hunter

- **Noise of jets may become political issue.**
- **California contingent in Florida growing.**

LET Boeing and Douglas beware. The politicians are becoming increasingly aware of the fact there are votes to be garnered out of the aircraft noise issue. Practically a sure sign of trouble. Both manufacturers plan noise suppressors for their new jet transports, but haven't finalized methods.

Hunter

Big problem is muffling the jet blast without losing too much power. Around 2% probably is as much as the plane-makers dare sacrifice in the interest of peace and quiet. Pratt & Whitney has one device, incorporating a multitude of small holes, which is designed to change the audible pitch of the J57s throaty roar. This—so we're told—may be very well for the human ear, but would set the canine population on edge.

• •

The California contingent in Florida keeps growing as the Air Force quickens the pace of intercontinental missile development. North American Aviation tops the list with about 500 employes now located at Cape Canaveral on the ramjet SM-64's flight test program. Northrop Aircraft has 375 moving the turbojet SM-62 Snark along. Convair moves in next year with a new $3,500,000 test facility for the ICBM Atlas. Northrop's Snark, it might be added, met all requirements in a successful test firing a short time ago and is a hot project right now.

• •

Reports are around that Westinghouse has done a top job in a rework of its fire control system and the unit is back in the Douglas F4D after having been displaced briefly by the Hughes unit . . . Marquardt Aircraft probably will settle on Salt Lake City for the location of its ramjet engine production facility . . . Menasco, which makes bottles for the Douglas-Santa Monica Nike at its Burbank plant, also will make 'em for Douglas-Charlotte at its new Texas facility . . . Aviation keeps right on getting more complex. The tabulating department at North American Aviation, we will have you know, is now called the Integrated Data Processing department.

• •

Western Air Lines' total mail pay revenues this year won't even cover the cost of the company's employ welfare program, showing how far it is removed from subsidy . . . The Flying Tiger Line turned Detroit into the busiest station on the system by making it the big transloading point instead of Chicago. Handles more than 350 flights and 4,500,000 pounds of freight a month . . . Seaboard & Western tells aircraft manufacturers an air freighter with a payload of around 60,000 pounds would be just about right for the next equipment go-around.

• •

Northrop Aircraft has put more than 250,000 man-hours on its long-range interceptor studies. Ed Schmued, Northrop's v.p. of engineering, was an original espouser of the LRI principle. Most observers count the company as having more than an even chance to be one of the two survivors of the Air Force's three-way Phase I competition, soon due for decision. But no one seems to be predicting whether Lockheed or North American will be the one to drop out.

• •

Fuel capacity of the domestic DC-8, with J57 engines, is 13,338 gallons, compared to the 18,523 announced for the overwater version with J75s. Or, perhaps, we should stipulate that these were the figures the other day. The way Boeing and Douglas have been popping up with design revisions from day to day, there's no telling how long a number will stand up.

• •

North American Aviation is going to build a wind tunnel for its Columbus division . . . American Airlines still isn't talking about its plans for DC-7 coaches, but come spring, they'll be along . . . More and more companies engaged predominantly in defense work—some a full 100% military—are looking around for diversification along commercial lines . . . Burns Aero Seat won the competition for the pilots' seats in the Lockheed Electra, a nice plum.

Merry Christmas!

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# WHAT DO YOU KNOW ABOUT AVIATION...

## *Who Was the Father of Jet Aviation?*

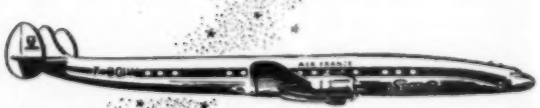
Far back in 1909, a young Frenchman decided that there could be a different type of aircraft other than the then currently accepted "kite" models. Putting his ideas to work, he built a plane powered by a turbo-propulsor, with a fuselage of slender silhouette, a delta-form tail assembly, a retractable landing gear and wings of polished plywood. In April, 1910, his revolutionary plane took off – and flew. The young man's name was – and is – Henri Coanda.

Today his ideas have reached fruition in the modern age of jet transportation. Still active, he typifies the spirit that has kept France to the fore of international aviation . . . the spirit that has enabled Air France to successfully serve the people of 76 countries for 37 years.

*Henri Coanda today.*

*The first Jet aircraft.*

*The jet turbine of the Coanda motor designed in 1909.*



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# International Aviation

By Anthony Vandyk

It's a long way from Scandinavia to New Guinea, particularly in a Junkers Ju 52. Nonetheless, Gibbes Sepik Airways, which operates in New Guinea, didn't bat an eyelid at the prospect of ferrying the aircraft half way round the world when it located a couple of the veteran German trimotors available for a low price in Sweden.

The first Ju 52 provoked quite a flood of reminiscences among the older German personnel at Dusseldorf airport where it made a refueling stop. There haven't been many Ju 52s in the German sky since 1945.

*Although Germany may never again come up with a world beater like the Ju 52 (there's still no aircraft available today that can carry such a big payload out of such small airports) the German aircraft industry is fast getting on its feet again (*American Aviation, *Oct. 10). However many observers, both inside and outside Germany, question the wisdom of the close ties which the German industry is forming with the French and Italian industries to the exclusion of the U.S. and British industries.*

Contact between the German and U.S. industries is not easy in view of the lack of an international association of aircraft and engine manufacturers which could link the German manufacturers' organization (Bundesverband der Deutschen Luftfahrtindustrie) with the Aircraft Industries Association of America.

*It is true that on paper there is such an association, the Association Internationale des Constructeurs de Materiel Aeronautique (AICMA) which, as its name suggests, is principally backed by the French and has its headquarters in the premises of the French aircraft industries association (Union Syndicale des Industries Aeronautiques). Andre Granet is secretary-general of both groups. Although membership is open to all national aircraft industry associations, at present all AICMA's members are continental European associations and manufacturers. AIA and the Society of British Aircraft Constructors are conspicuous by their absence.*

Despite its limited membership AICMA is doing good jobs in various fields. It is setting up a cooperative wind tunnel program, since many of its members do not have modern facilities of this type nor indeed have sufficient use for one of their own. Under the AICMA program everyone has access to the cooperative tunnel, which is located in the Netherlands.

Furthermore, the group is trying to spread subcontracting among its members. For example, it is hoped to arrange for subcontract work on the Fokker F-27 to be given to companies needing additional business (the Dutch aircraft industry is working to capacity). It makes a lot of sense for the relatively weak continental European aircraft industries to work together in this way provided that in so doing they are not precluded from cooperating with their American and British counterparts.

## Finnish Airline to Fly to Moscow

The first non-Communist nation's airline since the war to receive Soviet permission to start service to Moscow is Finland's Aero O/Y. Officials of the Finnish airlines will discuss final details for inauguration of the service very shortly and it is hoped to begin operations in about a month.

The Aero O/Y service to Moscow will represent the first time that modern U.S. pressurized equipment is used on scheduled flights to the Soviet Union (Convair 340s will be operated.) It will also be the first non-stop operation between Helsinki and Moscow. Aeroflot will open a reciprocal non-stop service but will continue the present service via Leningrad. Aeroflot currently operates two flights on six days each week over the Moscow-Leningrad-Helsinki route using Ilyushin I1-12 equipment.

It is not yet known how many flights will be operated non-stop between Helsinki and Moscow but each carrier will have an equal number—the bilateral air transport agreement between Finland and the Soviet Union prescribes that frequency shall be established between Aero O/Y and Aeroflot on a 50-50 basis.

### Transport Briefs

**New Zealand National Airways Corp.** has ordered three Viscount 800s; it currently operates 23 DC-3s, four Herons and six Dragon Rapides . . . **Qantas Empire Airways** has sold the last of its fleet of L-749 Constellations and now uses Super Connies exclusively on trunk routes; it got $12 million for the sale of the six L-749s, which is equivalent to their total purchase price in 1947 . . . **Compania Mexicana de Aviacion** has ordered four DC-7Cs for delivery starting in January 1957 . . . **Panair do Brasil** plans to acquire four of the 45 jet transports (Boeing 707s and Douglas DC-8s) ordered by PAA. Export-Import Bank financing has yet to be arranged.

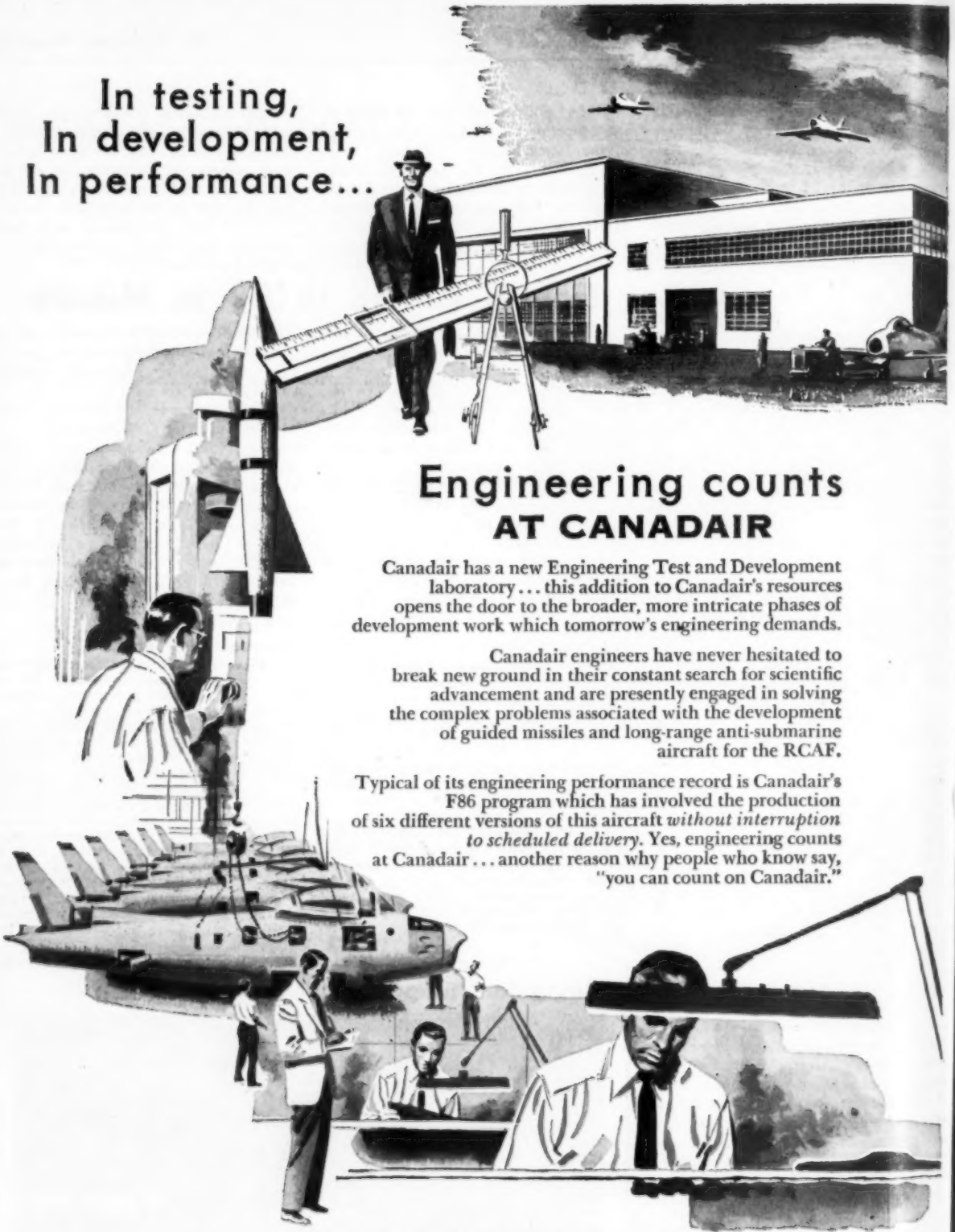
### Manufacturing Briefs

**Vickers-Armstrongs** now has the first stretched-fuselage Viscount 800 on the line; this pre-production aircraft is due to be test-flown next summer . . . **SNCA du Sud-Ouest** will start an experimental production line of Trident rocket-plus-jet fighters for delivery starting at the end of 1956; company is soon to resume tests with its Farfadet convertiplane . . . **Fiat** and **Bristol** are signing a technical assistance agreement under which the Italian company will be helped by the British firm in the turbine field. Fiat is also to acquire the license to the Bristol Orpheus . . . Latest Italian jet trainer project is the **Ambrosini** P. 18; it will gross 2,870 lbs. and have a top speed of 290 knots.

## Slated for Adoption by Luftwaffe

First German-Designed aircraft likely to be adopted by Germany's revived Luftwaffe is the Dornier Do 27, a liaison aircraft with exceptionally good slow flying characteristics (down to 30 mph). Top speed is 155 mph.

# In testing, In development, In performance...



## Engineering counts AT CANADAIR

Canadair has a new Engineering Test and Development laboratory... this addition to Canadair's resources opens the door to the broader, more intricate phases of development work which tomorrow's engineering demands.

Canadair engineers have never hesitated to break new ground in their constant search for scientific advancement and are presently engaged in solving the complex problems associated with the development of guided missiles and long-range anti-submarine aircraft for the RCAF.

Typical of its engineering performance record is Canadair's F86 program which has involved the production of six different versions of this aircraft *without interruption to scheduled delivery*. Yes, engineering counts at Canadair... another reason why people who know say, "you can count on Canadair."

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CA58-17U57

# Piper Apache Star of Company's Line Despite $1,500 Boost in Price

Two-toned paint job is feature of all three basic Piper planes, the Apache, the Tri-Pacer and the Super Cub. Twin-engined Apache is favorite of line.

By LOIS C. PHILMUS

It was obvious during the recent Piper distributor's meeting in Lock Haven, Pa., that the Piper twin-engine Apache is the "star" of its line. While the first official announcement of the 1957 marketing of the all-metal, high-performance single-engine Comanche stole the show for a while, the Apache is the celebrity around which 1956 plans have been built. Even announcement of a $1,500 boost in price on the three Apache models failed to dim the enthusiasm.

J. W. Miller, sales manager, keynoted the trend by reporting that there had been an increase of 800% in retail sales since 1949, with sales hitting $20.5 million in 1955. This is more than double the previous high of $10 million set in 1953. He set the sales quota for 1956 at a goal of $30 million. The Apache is the great white hope to reach the mark. Plans call for:

• Two per day Apache production this winter. A new 60,000-square-foot assembly building for the Apache is virtually completed.

• Apache service program to start shortly after the first of the year. Approved stations, labeled "a must" by Miller, will be authorized by Piper. To accomplish this, a mechanic's school will be established in Lock Haven for distributors' service managers. One class, with attendance limited to 10, will start each week until all managers have received training.

• Optional increased range and five-passenger seating capacity.

The five-seat configuration will be available after February 1. Room for the fifth seat has been provided through the redesign of the cabin and baggage compartment by removing the hat shelf. Thus, the baggage compartment becomes an integral part of the cabin, providing an unobstructed floor space of 108¾ inches long for five seats. A second optional seating plan also will be provided, with installation of specially designed, airline-type reclining seats.

The Apache's range can be increased up to 1,200 miles by adding two 18-gallon fuel cells outboard from the regular 36-gallon fuel cells in each wing, giving a total capacity of 108 gallons. The standard 72-gallon capacity provides an 840-mile range.

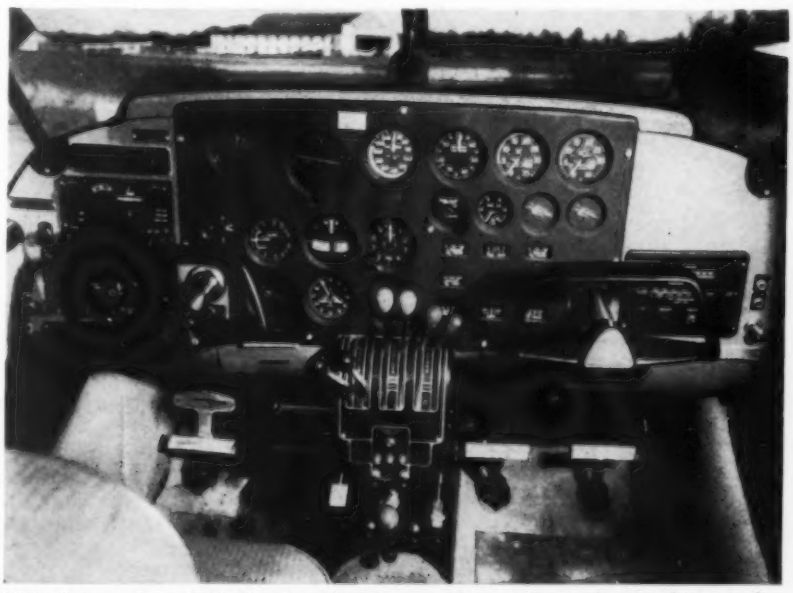
New prices, effective this month, are $34,000 for the Standard model which excludes radio: $36,790 for the Custom; and $38,310 for the Super Custom. The all-metal twin is powered by Lycoming 150 hp engines with full-feathering constant-speed Hartzell propellers. It cruises at 170 mph and has a service ceiling of 20,000 feet.

• **Despite the heavy concentration** on the Apache, the Tri-Pacer and Super Cub are still holding their own. The 1956 models are essentially the same as the 1955s. A major revision on the Tri-Pacer instrument panel has been incorporated, however. Flight instruments have been regrouped directly in front of the pilot. Radio equipment has been moved to the center of the panel, which permits operation by either pilot or co-pilot. Individually adjustable front seats also have been **added.**

New prices set on the three Tri-Pacer models are: Standard, $7,295; Custom, $7,895; and Super Custom, $8,895.

Possibility of adding an amphibious plane to the Piper line was fully discussed during the meeting. A representative of Edo told the group that a special amphibious float could be designed, similar to the one used by Cessna. He said the "ideal" Piper aircraft for the installation of floats would be a Pacer body with Super Cub take-off and climb characteristics. The two-to-three passenger amphibian would sell for about $12,000, it was indicated.

Piper came up with what is believed to be another first when it announced the production of a series of TV commercials. It is probably the first time that an aircraft manufacturer has attempted to sell business aircraft via television. The commercials are aimed at encouraging business men to visit the airport and take advantage of a special



Flight instruments on 1956 Piper Apache are grouped in center panel, painted in non-glare black for proper night lighting.

demonstration lesson offered by his local Piper dealer and to use the Piper "Learn as You Travel" program. ◈ ◈ ◈

## Beech Modification Available in Kit Form

A new Beech D-18s Beechcraft modification has been announced by Airline Training, Inc. of Fort Lauderdale, Fla. The modification, available in kit form, is said to increase gross takeoff weight from 8,750 lbs. to 9,000 lbs. A 20 mph speed increase also is claimed.

The modification includes a new type oil-cooler exit, with heat control located within accessory section, said to eliminate the possibility of controls icing up; specially designed outside ram-air trough installed on the carburetor, said to have increased takeoff critical altitude from 2,400 ft. to 3,850 ft., and automatic heating equipment for cabin and cockpit.

W. H. (Bill) Conrad, president of the firm, feels that "an unknown degree of safety has been attained by reducing the temperature in both the power and accessory sections." This was accomplished in the accessory section by discharging oil-cooler hot exit air over the top of the nacelle through a duct and a controllable flap instead of into the accessory section.

In addition to reducing oil-cooling drag under average temperature operating conditions, Conrad said, these modifications reduce the pressure in the accessory section from a ram pressure area to "substantially" a static pressure area.

The kit, priced at $12,500, includes all parts i.e., jet stacks, new dishpans, jet augmenter type exhaust troughs, oil cooler hot air exits, wheel well doors, etc., as well as the revised CAA-approved airplane flight manual. Installation cost is estimated at about $2,500.

## Tubular Takes Over Navion Parts, Service

Navion owners have been assured of the continued availability of parts and service following announcement of the sale of Ryan Aeronautical Company's complete inventory of Navion parts, along with the rights and production tooling for manufacture of additional parts, to Tubular Service & Engineering Company of Houston.

J. L. McConn, vice president of Tubular, announced that the Navion activity would be carried out at Galveston, Texas, as a division of Tubular, under direction of Leo F. Childs, manager of the aviation department. Priority will be given by Tubular to the manufacture of Navion parts in the greatest immediate demand, it has been stated. The first tools and parts are now being shipped from San Diego to Galveston.

Tubular will also provide parts and service to the Army and CAP using the military L-17 liaison planes.

It is estimated that about 2,000 of the nearly 2,400 Navions produced are still in service. North American Aviation, original manufacturer, produced 1,027 commercial versions and 83 military models. Ryan, which purchased rights in 1947, produced 1,075 commercial models and 163 of the L-17s.

## Pittsburgh Firm Buys Converted Martin 4-0-4

Southern California Aircraft Corp. has delivered a Martin 4-0-4 to National Supply Co. at Pittsburgh following conversion to an executive configuration.

The plane was purchased from Howard Hughes who had acquired it at the time TWA bought its fleet of 4-0-4s. Aside from tearing out the 44 airline seats and installing 18 Burns Aero plush executive seats, little actually had to be done to the airplane.

"CLIP-TYPE" closed entry socket contact now standard in

Bendix SCINFLEX ELECTRICAL CONNECTORS

CANNOT be overstressed—eliminates intermittent circuit problems resulting from socket contact malfunction.

Bendix-Scinflex* socket contacts have always been machined from bar stock. Stampings, with their required thin sections, can be easily overstressed.

Industry has also been plagued with overstressed spring leaves due principally to the misuse of test probes and lax tolerances on pin contacts. Bendix engineers now provide the only socket contact which completely eliminates all these problems.

The "Clip-Type" socket will not accept any oversize probe or pin, nor can one be forced into it. Also, no amount of wrenching or twisting of an acceptable pin or probe can possibly distort the spring clip. This new socket is now standard in all Scinflex connectors including those using solderless, high-temperature and thermocouple contacts.

Complete detailed information is available on request.

*TRADE-MARK

Bendix SCINTILLA DIVISION of Bendix AVIATION CORPORATION SIDNEY, NEW YORK

Circle No. 28 on Reader Service Card.

# TRANSPORT TRENDS

Washington, D. C., Dec. 19, 1955

DESPITE THE EARLY LEAD garnered by Douglas in the jet transport sales race, Boeing Airplane Co.'s position is expected to be improved momentarily with orders from three European operators. Sabena Belgian Airlines is known to have an option for five 707s, while Air France and Scandinavian Airlines System are understood to be close to buying the Boeing. Orders from the latter two may total as high as 20.

*As it stands now,* with Continental Air Lines' buying 707s and Japan Air Lines the DC-8, Boeing orders total 59 while Douglas is only one short of the 100-mark.

PACE OF JET BUYING has created a new problem for the group of small transatlantic carriers. One such airline is now seriously debating whether it is worthwhile to order two jets—that's all it requires and can afford. Yet the decision *not* to buy carries no alternative but to drop out of international competition altogether.

BIG QUESTION OF THE FUTURE now worrying many operators is: What happens to piston engine transports once the jets arrive? Comet experience showed passengers flocked to the jets and would only use piston transports when space limitations forced them to.

*With the recent surge of piston transport buying* (some are not due for delivery until mid-1958), a sudden public demand for jet space could become embarrassing. One approach now being weighed would relegate present-day aircraft to medium-range coach operations at lower fares, or alternatively, confine the jets to long-haul services at premium fares.

THE ANSWER TO JET TRANSPORTATION'S two big problems—noise and thrust reversal—may evolve in a single tailpipe device if present design activity in that direction is successful. Boeing Airplane Co. has ground-tested one thrust reverser at speeds up to 98 mph and is combining its further development with that of a sound-suppressor. Latter unit would mix exhaust gases with surrounding air to reduce noise level, but would have no appreciable effect on total available engine thrust.

THERE IS LITTLE POSSIBILITY THAT CONGRESS will balk at confirming New York Democrat G. Joseph Minetti to CAB. This is apparent despite attempts to make political hay out of his displacement of Josh Lee on the Board.

*First, supporters of Lee realize* that even if Minetti were not confirmed, nothing could be done to force re-appointment of Lee at this stage. Second, being a Democrat, the Democratic-controlled Congress would be hard-pressed to deny Minetti a seat on the Board. Third, and perhaps more significant, a political party hesitates to rile the State of New York in an election year.

APPOINTMENT OF CAB CHAIRMAN Ross Rizley to a Federal judgeship is now expected in early January. The Administration, at presstime, was hoping to have a successor to the CAB Chairmanship ready to name simultaneously with Rizley's appointment.

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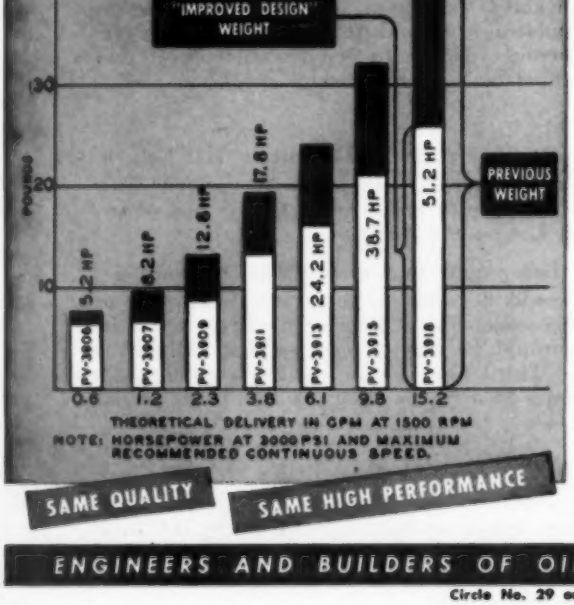


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INDUSTRY'S GREATEST ROUTE EXPANSION YEAR

# Optimism Follows Wave of CAB Grants

**Recent decisions strengthened regional trunks, corrected route deficiencies, removed antiquated restrictions and expanded long-haul service.**

By WILLIAM V. HENZEY

MOST COMMON expression in Washington symbolizing numerous new route awards made by the Civil Aeronautics Board this fall is that "all the ornaments have fallen off the Christmas tree." It's merely a poetic way of saying that virtually all possibilities for new airline competition in the U.S. have been exhausted in the greatest wave of route grants in CAB's 17-year history.

The statement is not entirely accurate, however, since there is still heavy pressure for a third carrier in the New York-Miami market. An official look is being given to added competition in the Great Lakes-Miami area, and perhaps one or two other areas will come in for scrutiny during 1956.

It also must be tempered by the realization that over-expansion is as inherent in such a grandiose give-away as is economic strengthening. And only time will tell whether the route grants can be considered prize grants or crippling extensions which will lead to another round of mergers.

But optimism generally marked the awards and, since this is the most profitable period in airline history, optimism shall prevail until experience dictates otherwise.

• **The new layer** or layers of competition were spread throughout the country by CAB in decisions in the New York-Chicago Case (Sept. 1), Denver Service Case (Nov. 14), and Southwest-Northeast Service Case (Nov. 21). The cases were in progress for several years and mark a complete turn-about from a decision almost five years ago in which major route awards were shelved in favor of interchange operations.

That old decision, in the Southern Service to the West Case in Feb., 1951, was the occasion for a warning that "individual applicants face a major, if not insurmountable task" in seeking approval of future route proposals.

Reasons given were two-fold: First, CAB felt too much route mileage had been doled out in the past resulting in some cases of excessive competition. Second, technological developments succeeded in making available greater capacity over established routes than necessary at then existing fare levels.

While the decisions of the past few months signalled an end to that type of thinking, the die actually was cast over two years ago when, after a bitter internal CAB battle, the three cases were activated with a definite view to stepping up competitive aspects of the domestic trunk industry.

By way of re-capping the recent decisions, the most talked-about philosophy involved was that of strengthening regional trunklines. Of nine carriers in that category, major route extensions were granted to six—Braniff, Capital, Continental, Delta, Northwest, and Western.

Awards to the "Big Four" in those same decisions came under various philosophies, including lifting of antiquated restrictions, correcting route deficiencies and satisfying public need for additional long-haul services.

On an individual carrier basis, here is how the industry fared in the three proceedings, starting with the regional carriers:

• **BRANIFF:** Granted first-time access to New York in Southwest-Northeast (SW-NE) Case and made a direct competitor with American Airlines between Dallas/Fort Worth and New York, with intermediate service available to Oklahoma City, Tulsa, Memphis, Nashville, Chattanooga and Washington.

CAB feels it has given Braniff access to a market which will produce $37 million next year, of which Braniff should get over $11 million.

Said the Board: "Braniff is the most marginal of the unsubsidized domestic trunk carriers and has the greatest need for route strengthening of the applicants in this case."

• **CAPITAL:** Made a direct competitor in New York-Chicago and New York-New Orleans markets. In NY-CHI case, Route 14 was extended from Detroit to New York via Buffalo and Rochester; unrestricted service was authorized between New York, on one hand, and Detroit, Pittsburgh, Chicago and Toledo, on the other; and Philadelphia was added as an intermediate on Routes 14 and 55.

In SW-NE case, Route 51 was extended from Washington to Baltimore, Philadelphia and New York. Adjustments were made in southern routes to permit service between New Orleans, Atlanta, Washington and points north to New York. In this case alone, CAB estimated it had given Capital access to an annual market in excess of 535 million revenue passenger miles.

• **CONTINENTAL:** In Denver Case, was made a major competitor in Chicago-Los Angeles market. CAL's route 29 was extended from Kansas City

## First Flight of Fokker F-27

Fokker's F-27 Friendship turboprop transport has made its first flight at Schiphol Airport, Amsterdam. Powered by two Rolls-Royce Dart turboprops, the Friendship is designed to accommodate 28-36 passengers. Second prototype will be three feet longer, to allow for 32-seat configuration.

to Chicago in the east and from Denver to Los Angeles in the west. Through route now reads from Chicago to Kansas City, Denver and Los Angeles.

CAB estimates that Continental will attract total additional commercial revenues of $5.8 million and incur additional expenses of $4.9 million for a net improvement in its break-even position of $918,000 and a subsidy saving of approximately $200,000 annually.

• **DELTA:** In SW-NE case, granted first-time extension to New York. Certificate was amended authorizing service beyond Atlanta to co-terminals New York/Newark via Charlotte, Washington, Baltimore and Philadelphia. Also granted connecting link between New Orleans and Houston.

Nonstop rights are included from Houston, New Orleans or Atlanta to major northeast cities. Dallas/Fort Worth-New York service is subject to a required stop at Atlanta.

According to CAB figures, Delta thus is given access to a traffic potential of 819 million revenue passenger miles or about $42 million annually. Board estimates Delta can capture slightly over one-fourth of that market.

• **NORTHWEST:** In NY-CHI case, was granted nonstop rights between Chicago and New York and authorized to operate unrestricted New York-Detroit service. New Chicago-New York service was restricted to "long-haul" flights which also serve Twin Cities or points west.

Said CAB: "Northwest remains the smallest and weakest of the transcontinental carriers . . . By granting NWA's entry into Chicago from the east we will be remedying a major weakness in NWA's route structure and enable it to become a more effective competitor with United in transcontinental service."

### Profitable Route

• **WESTERN:** In Denver Case, Route 35 extended from Denver to San Francisco/Oakland via Salt Lake City and Reno. In 1956, CAB estimates this route will produce over $3 million additional revenue for Western, operating expenses will run slightly over $2 million and net operating income will be about $998,955.

Said the Board: "Where markets logically integrate with Western's regional route system and will strengthen the smallest of the nonsubsidized trunk carriers, at no cost to the government and without significant adverse effect upon existing carriers, Western was selected to meet demonstrated need for regional service."

Furthermore, the Board said, "Selection of Western over Continental to perform regional operations on the Denver-San Francisco segment will favor a carrier that has historical participation in these markets and can initiate such new services with a minimum of additional expense."

Meanwhile, of the three remaining regional trunks not granted new routes in the three cases, Colonial is actively pushing a merger with Eastern; Northeast is an applicant for a New York-Miami route (to be decided early next year); and National, unsuccessful in

## Cities Service to Get First Convair 440

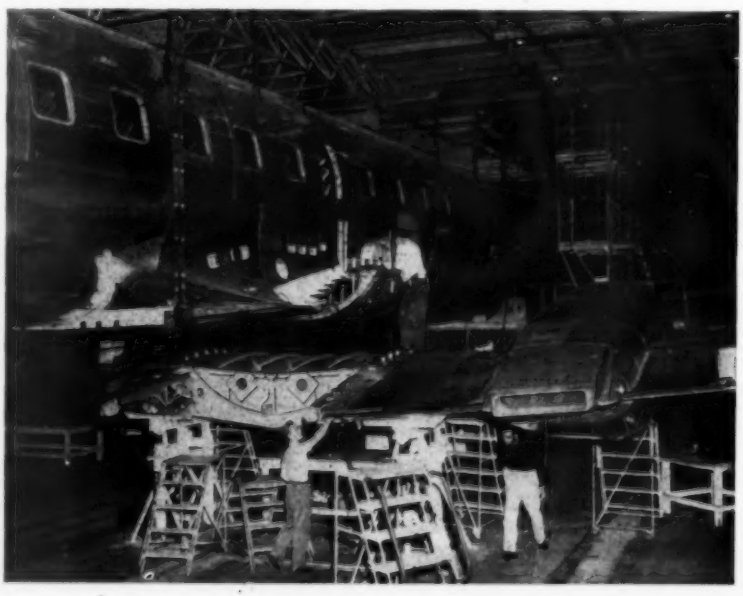
The first new Convair 440 Metropolitan will be an executive airplane and is scheduled for delivery to Cities Service Oil Co. in January. Photos here show mating of fuselage and wing at Convair Division of General Dynamics Corp. in San Diego, which took place two weeks ahead of schedule. This particular plane is an executive model.

Production on the 440 will continue through 1956 at a rate of eight aircraft a month, the same rate at which Convair was producing 340s at San Diego.

Convair now has firm orders for 64 Metropolitans on the books. Its options total 22. The firm orders include: Sabena, 12; SAS, 11; Swissair, 8; National, 6; Delta, 5; Braniff, 5; REAL, 4; Continental, 3, AERO/O/Y, 1; Cities Service Oil Co, 1; Union Producing Co., 1; Chilean government, 1.

Two other European companies have placed orders for six Convair 440s between them, but had not yet made formal announcement. Convair's 22 options include both domestic and European carriers.

Metropolitans are being delivered in two configurations. Most domestic airlines will utilize 44-passenger versions, but foreign carriers prefer a convertible configuration, which permits increasing up to 52-passenger capacity by removing a bulkhead and installing extra seats in the forward area.



NY-CHI and SW-NE cases, is an applicant in the new Great Lakes-Miami case.

But while the additional "strengthening" grants to the regionals were largely at the expense of the Big Four, the awards didn't stop there. Here's how the Big Four fared:

• **AMERICAN:** In Denver Case, was granted nonstop rights between Chicago and San Francisco/Oakland in direct competition with United and TWA. In SW-NE case, was granted first-time access to Houston and Pittsburgh, subject to restriction that Houston flights must also serve Pittsburgh.

• **EASTERN:** Despite several awards, benefits appear negative (1) because of heavy competition added to its routes and (2) its major application —Dallas to New York—was turned down. In NY-CHI case, a "closed door" restriction was lifted on service between Pittsburgh and Akron, Cleveland and Detroit. In SW-NE case, EAL was authorized to carry traffic between Pittsburgh and Atlanta, Mobile, Birmingham and New Orleans.

### Grand Slam for TWA

• **TWA:** Scored a "grand slam" with applications in all three cases granted largely on strength of successful operations in coach field. In NY-CHI case (plus a related decision issued simultaneously), granted first-time east-west rights at Detroit on New York-Chicago segment, and new Cleveland-New York service on flights serving St. Louis or points west.

In Denver Case, Route 2 amended to include Denver as new intermediate, thus making TWA a major transcontinental competitor for United at Denver.

In SW-NE case, Tulsa and Oklahoma City added as new intermediates on Route 2, and extension granted from Washington to New York.

• **UNITED:** Substantially heavy competition added to its routes but new awards made in NY-CHI and Denver cases. Kansas City and Pittsburgh added to Route 1 for first time; nonstop rights granted between Seattle/Portland and Chicago.

Two local service lines also figured in the decisions. Ozark Airlines, in the SW-NE case, was granted three year rights to serve Paducah, Ky. Mohawk Airlines was made a party to a new proceeding to determine who should get a nonstop Syracuse - New York award.

Certificate changes authorized in the New York - Chicago case became effective Nov. 1. Those in the Denver Case become effective January 13, 1956, and those in the SW-NE case on January 20, 1956. All new services will not necessarily start on the designated effective dates.

Additional planes, facilities and personnel, particularly pilots, must be acquired. Many services, however, have gotten or will get under way on the target dates and, whether profitable or otherwise, the coming year will provide the most spirited competition in the airline industry's short but dynamic history. ◆ ◆ ◆

# Eastern Buys DC-8, Braniff 707 As Jet Orders Near $1 Billion

The surge of airline orders for U.S.-built jet transports moved well on its way to the billion-dollar mark last week with these new developments:

• Eastern Air Lines announced orders and options totaling $165 million for 26 Douglas DC-8s. Six will be fitted with Pratt & Whitney J57 engines for delivery starting in May 1959, twelve will have the more powerful J75s, with first delivery in March 1960, and eight more on option will also be fitted with J75s.

• Earlier, Braniff Airways placed a $30-million order with Boeing for five 707s, the first to be delivered in October 1959. All presumably will be equipped with P&W J75s, although the announcement referred only to engines of "advanced design over the J57."

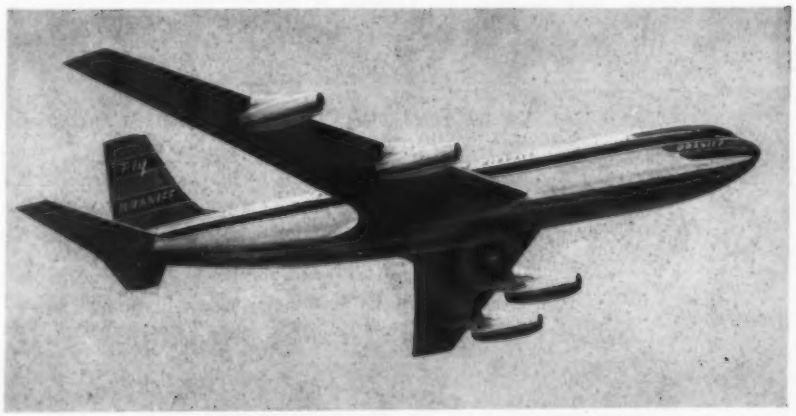
Together, the EAL and Braniff deals bring the total jets ordered since October 13 to 150. In the 55 days since Pan American ordered both DC-8s and 707s until the EAL decision, jet-buying by six U.S. and one foreign airline has mounted to $862 million, better than $15 million a day.

• **For Douglas,** which has now sold 95 DC-8s, the jet backlog is close to $600 million. This apparently puts the Santa Monica firm past its breakeven point on DC-8 development, as earlier estimates placed this figure between 65 and 80 aircraft.

This undoubtedly has changed somewhat with the evolution of two types of airplanes (J57 and J75 powered models) but engineering of two engine installations shouldn't extend the breakeven point as high as 95 planes.

At Boeing, orders now number 55

Eastern Air Lines' choice was Douglas DC-8 shown here in EAL markings.



Boeing 707 will be operated by Braniff in mixed-class service.

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G.E.'s cartridge turbostarter makes the Martin B-57 one of the first USAF jet aircraft in production to be equipped with ***self-contained*** starting power. With this lightweight system, the planes can operate from the most advanced bases, even where ground support may not be readily available. At any base, instantaneous group take-offs are now possible without waiting for ground power—allowing the planes to be dispersed for maximum protection against air attack.

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According to E. G. Uhl, Martin's Vice President of Engineering, "The Martin Company has used General Electric cartridge starters since they were available. Thousands of starts have been accomplished successfully under all types of environmental conditions. This starter gives our Air Force the most rapid engine start available and frees ground crews from the burden of handling expensive, complex starting equipment."

### Application to Any Aircraft

General Electric self-contained starters are designed to meet the needs of tomorrow's jet aircraft starting power, either military or commercial. In addition to the models now available, a 46-lb fuel/air turbostarter that is only 12½ inches long and will produce 10 ft-lb of torque for each pound of weight is in the works. This drive can be easily modified for your specific engine requirements and energy sources.

For further information on G-E turbostarters and other accessory drives, manufactured at the Aircraft Accessory Turbine Dept., West Lynn 3, Mass., contact your local G-E Apparatus Sales Office.

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**Only two airframe connections, electricity and exhaust, are required to mount the starter.**

**Integral quick attach-detach mechanism makes mounting a fast, one-man job.**

valued at about $275 million, also bringing that company close to the breakeven point.

### Mixed-Class jets

In announcing its 707 order, Braniff president Charles E. Beard said the jets will be operated in mixed-class service (49 first-class and 69 tourist seats) for a total of 118 passengers. Braniff plans to operate them on both its domestic and international routes, including the newly awarded segment from the southwest to Washington and New York.

Typical flying times were listed as: Dallas/Ft. Worth-Chicago, 1 hr. 38 mins. (now 3 hrs. 10 mins.); Houston-Chicago, 1 hr. 53 mins. (now 3 hrs. 40 mins.); Dallas/Ft. Worth-New York, 2 hrs. 36 mins. (now 5 hrs. 40 mins.)

**JET BOX SCORE**

| Airline | No. of Planes | Type Ordered | Dollar Value (millions) |
|---|---|---|---|
| Pan American | 20 | 707 | 109 |
| | 25 | DC-8 | 160 |
| United | 30 | DC-8 | 175 |
| American | 30 | 707 | 135 |
| National | 6 | DC-8 | 36 |
| KLM | 8 | DC-8 | 52 |
| Braniff | 5 | 707 | 30 |
| Eastern | 26 | DC-8 | 165 |
| TOTAL | 150 | DC-8(95) 707(55) | 862 |

### 25-month Evaluation

• **Eastern chairman,** Capt. E. V. Rickenbacker, said its DC-8 order comes after 25 months of evaluation studies by the airline's engineers of all jet transport and engine proposals in the U.S. and abroad.

He said the final selection was based on warranties EAL felt were required from manufacturers of engines as well as aircraft to assure it of an airliner capable of meeting the highest standards of dependability and efficiency needed to maintain U.S. air transportation as a profitable and unsubsidized industry.

DC-8's specified by Eastern will gross 251,760 pounds and will carry over 100 passengers in a "super-luxury" layout and more than 130 as a "super-air-coach."

Normal cruising speed will exceed 550 mph and top speed is placed at 580 mph. ◆ ◆ ◆

# LASI Gets Crashed Planes Back in Air

**Lockheed Air Service International has salvaged many seriously damaged aircraft; crash repair becoming big business.**

By ANTHONY VANDYK

"Crash repair—anywhere" might well be the slogan of Lockheed Aircraft Service International were it not that crash repair is but a "side job" for the company. Although the company's main business is maintenance, overhaul and modification of all types of aircraft, crash repair is becoming increasingly important to the air transport industry and hence to LASI, a wholly-owned subsidiary of Lockheed Aircraft Corp.

Crash repair today has become big business. Aircraft have become so valuable that neither the airlines nor the insurance companies like to "write off" a crash if they can help it. It's not so much that the sales value of transport aircraft has increased but that their potential revenue-creating ability has become so great.

• **For example,** one major transatlantic airline discloses that, with a 60% load factor on a tourist flight, at a utilization of ten hours per day, it nets $3.60 per mile. Since the aircraft averages 72,000 miles per month the potential revenue from that aircraft alone totals $259,000 in a single month or over $3 million a year. To avoid loss of this revenue it is important that the aircraft be repaired if it is possible to do so.

To LASI, which has been in the crash repair business for 13 years, evaluation of whether an aircraft is or is not repairable is routine. The decision depends on many factors: local transportation and ground facilities; availability of compressed air and water; housing and food supplies for the repair; and, of course, availability of spares.

LOOKING LIKE NEW, this Constellation bears no traces of accident which resulted in right inner wing being gutted by fire. After temporary repairs were effected at Rio de Janeiro, scene of accident, the aircraft was flown to LASI's Idlewild base for rebuilding.

• **In the final decision** on the award of the contract, the attitude of both the airlines and the insurance companies are important. The insurance companies want to see the aircraft repaired or replaced as cheaply as possible. So do the airlines but they are more apt to say "Go ahead" because they want to keep their insurance rates down. Finally, in a foreign country, dollar reserves and currency conversion enter the picture.

So much for the theoretical. Now let's look at a practical example of LASI's crash repair organization at work. Recently an L-49 Constellation emerged from the LASI hangar at Idlewild and flew to South America. Few people who saw this ordinary-looking Connie take off knew that 45 days earlier the aircraft was in sad shape.

The entire right wing from the No. 4 engine inboard was burned out. The plane had burned on the ramp at Rio de Janeiro after the impeller in the No. 3 engine "blew up" during a full-power run-in. Pieces of casting slashed through the nacelle, severing fuel and hydraulic lines. Burning fuel flowed aft through the wing, pocking and blistering it from leading to trailing edge.

• **Within two days** LASI had put Neal Thomas, manager of engineering, on the scene, accompanied by an estimator and another engineer. Their offer to put the aircraft back into operational shape was accepted. Within two weeks they had fashioned repairs that made the Connie temporarily flyable.

The aircraft wore aluminum patches



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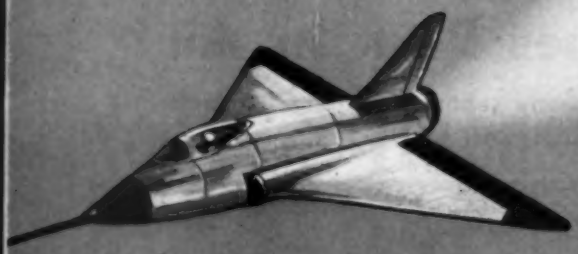
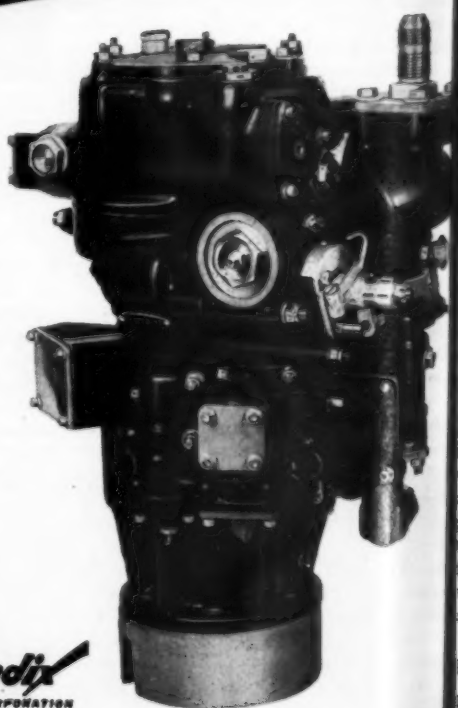


## FOR EXAMPLE...

This advanced type fuel metering unit was developed by Bendix to include special features for the 10,000-pound thrust class Pratt & Whitney J-57 turbojet—the engine which puts the power behind the super performance of the F4D Skyray.



As early as 1945, Bendix brought out a jet engine control which automatically metered fuel during engine acceleration and deceleration so as to avoid over-temperature, compressor stall and "flame out". Since then, these features have become a "must" on all jet engine controls, allowing the pilot to slam the throttle wide open without danger of ruining the engine, or slam it shut without risk of "flame out".

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These and other achievements are solid evidence that the aircraft industry can continue, as in the past, to look to Bendix for creative engineering and quality manufacturing.

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Bendix AVIATION CORPORATION

Export Sales: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.

wer plywood inserts, the doubles were fabricated from scrap and the leading edge was a modified L-749 edge. But the LASI inspectors, designated to act for CAA in such emergencies, said the L49 was flyable and flyable it was.

The Connie flew without incident from Rio to Idlewild where the second phase of the repair operation started. With adjustable supports holding the fuselage and wing, LASI men cut and sliced their way through burned-out metal, rolled the wing away from the fuselage, spliced in a new inner wing and replaced all burned-out plumbing, wiring and skin. While the aircraft was in the shops they repaired the left inner wing spar which had buckled some time before the fire. By the time LASI had finished with the Connie it was like new.

This was a relatively simple job compared with the repair of a Stratocruiser that was damaged at Keflavik, Iceland in February 1954. It ballooned just before touchdown and dropped on the icy runway, sustaining heavy damage in the right wing and flap, nose gear, and No. 2, 3 and 4 propellers. Forward fuselage belly skin and right lower wing skin were also damaged.

After being commissioned to do the repair job, LASI's first duty was to begin protective maintenance, since no hangar was available at the time. The No. 4 engine was removed, the vertical fin was folded and the flight deck was sandbagged to force the nose down and keep the plane from blowing away (winds at times hit 78 knots).

• **Jacks were installed** on the right wing jack pads and on the rear spar outboard the No. 4 nacelle. Then the right wing flap, trailing edge section, plumbing, after No. 3 nacelle and No. 3 fuel tank were all stripped. With hangar space finally available, the Stratocruiser was stripped of its No. 3 engine, damaged material in the right wing and forward belly.

A check showed that the aircraft was aligned basically within limits but that a serious out-of-line situation prevailed in the right gear assembly. Properly levelled, a program of daily alignments with a transit were made on the right wing in the course of rebuilding the spar web, spar caps and the chordwise ribs.

LASI obtained locally from Metcalfe, Hamilton, Smith and Beck pig iron blocks each weighing 1,820 lbs. for warping the wing structure back into alignment. With the removal of the engines it was necessary again to ballast the aircraft by stowing sandbags on the floor of the flight deck and cabin. Meanwhile completely disassembled engines and propellers were flown in to Keflavik.

The work at Keflavik was completed early in May and the plane successfully completed a 1¼-hour test flight at a gross weight of 110,000 lbs. It was flown to New York via Goose Bay, Labrador on May 14 for phase two of its repair program.

**TO REPAIR STRATOCRUISER that was damaged in Iceland, 1820-lb. pig iron blocks were obtained locally for weighting down the wing and warping it back into alignment.**

Preparations were well in hand at LASI's Idlewild base for the damaged Stratocruiser. A modified C-97 inner panel had been obtained from Boeing for the right wing. Because of its size crated—40 ft. long, 12 ft. wide and 9 ft. high—it was necessary to ship this 24,000-lb. replacement to Jersey City from Seattle by surface vessel via the Panama Canal. It was then trucked to Idlewild. Installation was completed on the ramp and the Stratocruiser was returned to its operator on July 24, five months after it cracked up at Keflavik.

• **Not all LASI repair** work involves bringing the damaged aircraft back to Idlewild. The company, for example, repaired "in the field" a four-engine transport that was badly damaged in Mexico City. The pilot, in taxiing the aircraft out to the strip, had run the left main gear into an island, washing it out and damaging the left inner wing. The inner wing replacement was ordered from the manufacturer and installed by LASI on the ramp after which the plane went directly back into service.

Occasionally, however, no repair work at all is done in the field. The plane is cleaned up and shipped to LASI in sections and everything is done in the home base shops. LASI repaired a Constellation in this way in 1951. During a training flight in Europe the pilot overshot the runway, crashed into a building and washed out the main gear, right wing and nose section.

The insurance company wrote the aircraft off but a U.S. company thought it could be repaired and thus bought the wreck for $100,000. It gave LASI a $200,000 contract to strip it, stuff wings, empennage and power eggs into the fuselage and ship the whole thing (52,000 lbs.) as deck cargo across the Atlantic to New York.

By this time L-49 parts were on short supply, but LASI keeps a running record of spares all over the world. A search showed that there was a C-69 (military transport version of the Connie) fuselage stored in Toulouse, France. LASI bought it and, with the use of salvaged parts from other L-49s, put on a new nose section. The hybrid Connie finally took to the air again and is still in service, logging about 3,100 hours a year.

(*Continued on page* 88)



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Typical of the types of projects Hoffman Field Engineers are working on, one group is presently engaged in conducting field evaluation studies at remote air bases on TACAN, the most advanced airborne navigation equipment yet produced. This field study is being coordinated with Hoffman's production of TACAN equipment.

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# Airline Commentary

By Eric Bramley

It's a pleasure to note that more airlines are turning to various types of gate check-in procedures. We hope the trend continues. It's hard to understand why a ticketed passenger must go through a lot of red tape at a counter. When the passenger can carry his bag, there's no reason at all. Lines at counters keep getting longer and longer. And there's no uniformity on check-in.

*Even seasoned travelers have trouble because no two companies seem to do things the same way. This may be playing an old record, but why isn't a uniform system possible—designed to keep as many people as possible away from the counters?*

* * *

Carriers concerned about their no-show problem will be interested to know that J. E. Ashman, president of Air Associates Inc., has instructed his sales and branch managers to give "special attention to assure that air travel reservations made by all departments are utilized as scheduled or canceled in sufficient advance to permit resale of the space by the airlines."

He adds: "The prosperity of our company depends upon the economic stability of every element of aviation. It is our interest to assure that airline revenue is not unfairly curtailed by no-show reservations. My air travel experience over the last several months leads me to believe that no-show is becoming a serious threat to airline economy.

"In case of last-minute cancelations due to unavoidable emergency, please call the airline in question at the earliest possible moment. In no case must a no-show without explanation of the emergency appear on the daily travel log of your division." Mr. Ashman deserves the plaudits of the industry.

* * *

*Try this for size: New York International Airport could contain the Polo Grounds, Yankee Stadium, Madison Square Garden, Ebbets Field, Governor's Island, Ellis Island, Bedloe's Island, Empire State Building, Chrysler Building, Grand Central Terminal, Pennsylvania Station, Port Authority bus terminal, the new New York Coliseum, UN headquarters, Rockefeller Center, St. Patrick's Cathedral, New York Public Library, Bryant Park and the 252-acre Bronx Zoo —and still leave 100 acres vacant for future expansion.*

## Sales, Traffic, Promotion

**Western Air Lines** stewardesses on "California" flights are now asking lone male passengers if they'd like their wives or secretaries to receive **WAL's** gift of perfume (presented to all women travelers on the flights). Passenger's business card is obtained and a flacon of "Carnet de Bal" perfume is mailed to the lady . . . New WAL folder describes savings in time and money made possible by using air coach instead of rail transportation . . . A military pamphlet is directed at enlisted personnel traveling on leaves and furloughs . . .

**National Airlines** is engaged in a big tie-in promotion with the movie, "Guys and Dolls." The 1,000-line ads feature the theme, "Guys and Dolls on the go fly National to Florida and Cuba," and are illustrated with pictures of the film's stars. Ads are running in Washington, Baltimore, Philadelphia, New Orleans, Jacksonville, Miami and Havana, coinciding with premieres in these cities. Company is also distributing on its flights a **"Smart Guys and Dolls Fly National"** brochure prepared by MGM, plugging the picture and the airline . . .

**NAL** is now permitting passengers to place bags under seats of DC-6s and DC-7s. It has "try-this-for-size" luggage frames at major stations—similar to system introduced by American Airlines . . . Company is distributing colorful new posters covering service to New Orleans, Miami, Philadelphia, New York, Washington and Havana. Cleverly done . . .

**American Airlines** agents at Amon Carter Field have started a "Man of Distinction" club. Any agent receiving a commendation letter from a passenger gets his picture (and the letter) posted on a large plaque in the AA office. Aim is to have entire agent complement on the plaque . . .

**United Air Lines** is releasing a new 16 mm. color-sound 29-minute movie, "Points East," covering travel to the Atlantic seaboard . . . **Midway Airlines,** Chicago's shuttle service, carried 11,803 passengers in the third quarter of 1955, up 71% over the 6,902 total for the same 1954 period . . .

Watch for **BOAC** and **Capital Airlines** to announce an "all Viscount" package tour to Bermuda. Capital put Viscounts into New York this month, and **BOAC** began New York-Bermuda service with the turboprop . . . One of Capital's most successful packages remains the "Weekend at the Waldorf." Over 100 people from Detroit alone will make the New York trip this month . . . Company has experimented successfully with a "Show Plane" deal, which it hopes will replace "show trains." First trip, Pittsburgh-New York, was sponsored by a Pittsburgh newspaper and the Council of the Living Theatre. Three DC-4s carried 180 people (many more applications were turned down) who paid $89.13 for three days in New York including tickets to four shows and all expenses except meals. Trips from other points are planned . . .

**Northwest Airlines** has redecorated Boeing Stratocruiser lounges; new name is "Fujiyama Room." Features include Japanese cotton curtains, paintings of Fujiyama and other Japanese scenes, and artificial Ming Trees . . . **NWA** is not selling lounge seats on New York-Chicago, Chicago-Portland, Chicago-Seattle and Minneapolis-Spokane segments. Fourteen seats are involved . . . All Stratocruiser flights are now stocked with Japanese beer . . .

**TWA** says its coast-to-coast tourist travel has jumped almost 60% since inauguration of Monday-through-Thursday excursion fare of $80 each way. During October, TWA averaged 665 tourist passengers per day against 419 in same 1954 month, when $99 fare was in effect all week. Also, October traffic on Mondays through Thursdays only, showed 80% gain over same period last year, seven days a week. New fare has equalized traffic on each day of the week, TWA says. In October, 1954, average daily tourist passenger-miles Monday-Thursday were 76% of first-class. For same October days this year, tourist was 88% of first-class . . .

**Lufthansa** German Airlines has opened new office in Detroit, at 1249 Washington Blvd. (Book Bldg.) Jacob Kunzmann is district sales rep. . . . Lufthansa is offering several European package ski tours (Germany-Austria, $694; Austria-Switzerland, $715) . . .

Unusual airline ad is being carried by **Bonanza Air Lines** in the Virginia City, Nev., **Territorial Enterprise.** Virginia City, an old mining town, has been put somewhat back on the map by Lucius Beebe, who reactivated this paper once edited by Mark Twain. Ads must be in keeping with the old-time theme. Therefore, in advertising its service from nearby Reno to Las Vegas, BAL shows a picture of a balloon, and states: "Twice daily ascensions to Las Vegas. These contraptions ply at a lively rate. Public patronage is solicited." . . . BAL has issued a folder offering DC-3s for charter . . . October was record charter month for **Trans-Texas.** Twenty charters brought gross revenue of $20,034 . . .

## TWA Names Clemson VP, Passenger Service

TWA has elevated passenger service to the status of a major department, and 26-year-veteran John H. Clemson has been elected vice president in charge of both domestic and international service activities.

Clemson, who for several years has been general traffic manager, was one of the original employes of Transcontinental Air Transport, parent of TWA, joining TAT on June 1, 1929. His headquarters will continue at 380 Madison Ave., New York.

(*Continued from page 85*)

LASI's success stems mostly from its ability to do the job when the chips are down. The company's crews have used an automobile spring as a stiffener for a spar cap in Karachi; they have fashioned an adjustable jack out of hand-hewn timber in Dakar, and they have built fixtures from scrap iron in Gander. In any part of the world, in fact, LASI will take care of the situation. ◈ ◈ ◈

# CAB NEWS

### Pending Cases

**CAB has turned down proposals to expand the Detroit-Cincinnati Route Transfer Case as suggested by various carriers. Trans World Airlines agreed to transfer the segment if granted east-west rights at Detroit. The rights were granted and CAB set up an investigation on the transfer issue. With hearings scheduled for early next year, the issues as now defined by CAB are: (1) Should the transfer be made and (2) if so, to what carrier?**

**Still in the smouldering stage but not yet activated is a case centering around Pan American and TWA applications for direct service, including polar rights, from California to Europe.**

### Recent Applications

**Capital, Northwest, United and National among latest carriers to apply for routes in Great Lakes-Miami area, subject of next big CAB route proceeding.**

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## SUMMARY OF U. S. DOMESTIC AIRLINE REVENUES AND EXPENSES FOR THIRD QUARTERS OF 1955

(Compiled by American Aviation Publications from official CAB data.)

| AIRLINES | TOTAL OPERATING REVENUES (IN MILLIONS) 1955 | 1954 | % Change | PASSENGER REVENUES (IN MILLIONS) 1955 | 1954 | % Change | FREIGHT REVENUES (IN THOUSANDS) 1955 | 1954 | % Change | TOTAL OPERATING EXPENSES (IN MILLIONS) 1955 | 1954 | % Change | AIRCRAFT OPERATING EXPENSES (IN MILLIONS) 1955 | 1954 | % Change | GROUND & INDIRECT EXPENSES (IN MILLIONS) 1955 | 1954 | % Change | NET OPERATING INCOME (IN THOUSANDS) 1955 | 1954 | % Change |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| American | 68.6 | 42.4 | 61.8 | 61.4 | 38.2 | 60.7 | 3,773 | 2,176 | 73.4 | 56.3 | 43.3 | 30.0 | 26.9 | 19.6 | 37.2 | 29.3 | 23.7 | 23.6 | 12,307 | -913 | . . . |
| Braniff | 10.1 | 9.8 | 3.1 | 9.3 | 8.6 | 8.1 | 263 | 242 | 8.7 | 9.1 | 8.0 | 13.8 | 4.6 | 4.0 | 15.0 | 4.6 | 4.0 | 15.0 | 985 | 1,824 | -46.0 |
| Capital | 14.1 | 13.8 | 2.2 | 12.9 | 12.5 | 3.2 | 295 | 271 | 8.9 | 12.8 | 12.3 | 4.1 | 6.1 | 6.0 | 1.7 | 6.7 | 6.3 | 6.3 | 1,249 | 1,497 | -16.4 |
| Colonial | 2.2 | 2.1 | 4.8 | 2.1 | 1.9 | 10.5 | 39 | 30 | 30.0 | 2.1 | 1.9 | 10.5 | 0.9 | 0.9 | . . . | 1.2 | 1.1 | 9.1 | 142 | 141 | 0.7 |
| Continental | 4.4 | 3.2 | 37.5 | 3.8 | 2.9 | 31.0 | 108 | 70 | 54.3 | 4.2 | 2.8 | 50.0 | 2.2 | 1.5 | 46.7 | 2.0 | 1.3 | 53.8 | 270 | 387 | -30.2 |
| Delta | 13.7 | 12.0 | 14.2 | 12.4 | 10.9 | 13.8 | 441 | 374 | 17.9 | 12.1 | 11.2 | 8.0 | 6.6 | 6.1 | 8.2 | 5.6 | 5.2 | 7.7 | 1,501 | 894 | 68.3 |
| Eastern | 42.8 | 38.0 | 12.6 | 39.5 | 35.3 | 11.9 | 672 | 520 | 29.2 | 39.7 | 35.4 | 12.1 | 23.3 | 21.4 | 8.9 | 16.4 | 14.1 | 16.3 | 3,075 | 2,537 | 21.2 |
| National | 9.8 | 8.3 | 18.1 | 8.8 | 7.4 | 18.9 | 234 | 264 | -11.1 | 8.9 | 8.2 | 8.5 | 4.6 | 4.4 | 4.5 | 4.3 | 3.8 | 13.2 | 904 | 114 | 693.0 |
| Northeast | 3.5 | 3.3 | 6.1 | 3.1 | 2.9 | 6.9 | 73 | 65 | 12.3 | 3.0 | 2.8 | 7.1 | 1.4 | 1.4 | . . . | 1.6 | 1.4 | 14.3 | 508 | 492 | 3.3 |
| Northwest | 15.4 | 13.4 | 14.9 | 14.1 | 12.4 | 13.7 | 491 | 344 | 42.7 | 12.0 | 10.5 | 14.3 | 6.5 | 5.7 | 14.0 | 5.5 | 4.8 | 14.6 | 3,401 | 2,914 | 16.7 |
| TWA | 44.3 | 43.2 | 2.5 | 40.5 | 39.0 | 3.8 | 1,284 | 1,272 | 0.9 | 39.0 | 32.9 | 18.5 | 20.9 | 17.6 | 18.8 | 18.1 | 15.3 | 18.3 | 5,288 | 10,285 | -48.6 |
| United | 63.6 | 57.8 | 10.0 | 56.4 | 51.4 | 9.7 | 2,501 | 1,992 | 25.6 | 52.5 | 45.4 | 15.6 | 24.9 | 22.0 | 13.2 | 27.6 | 23.4 | 17.9 | 11,091 | 12,394 | -10.5 |
| Western | 8.8 | 6.9 | 27.5 | 8.3 | 6.5 | 27.7 | 164 | 120 | 36.7 | 6.8 | 5.6 | 21.4 | 3.5 | 2.8 | 25.0 | 3.4 | 2.8 | 21.4 | 1,998 | 1,338 | 49.3 |
| TOTALS | 301.3 | 254.2 | 18.5 | 272.6 | 229.9 | 18.6 | 10,338 | 7,720 | 33.9 | 258.5 | 220.3 | 17.3 | 132.4 | 113.4 | 16.8 | 126.3 | 107.2 | 17.8 | 42,722 | 33,904 | 96.0 |

## SUMMARY OF U. S. LOCAL SERVICE AIRLINE TRAFFIC FOR THIRD QUARTERS OF 1954 AND 1955

(Compiled by American Aviation Publications from official CAB data.)

| AIRLINES | REVENUE PASSENGERS (IN THOUSANDS) 1955 | 1954 | % Change | REVENUE PASSENGER MILES (IN 000'S) 1955 | 1954 | % Change | AVAILABLE SEAT MILES (IN THOUSANDS) 1955 | 1954 | % Change | PASSENGER LOAD FACTOR 1955 | 1954 | FREIGHT TON MILES (IN THOUSANDS) 1955 | 1954 | % Change | TOTAL TON-MILES REV. TRAFFIC (IN 000'S) 1955 | 1954 | % Change | AVAILABLE TON-MILES FLOWN (IN 000's) 1955 | 1954 | % Change | % AVAILABLE TON-MILES USED 1955 | 1954 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Allegheny | 112.8 | 88.7 | 27.2 | 18.2 | 13.8 | 31.9 | 38.0 | 29.0 | 31.0 | 48.07 | 47.59 | . . . | . . . | . . . | 1,816 | 1,367 | 32.8 | 3,747 | 2,902 | 29.1 | 48.17 | 47.11 |
| Bonanza | 30.5 | 20.3 | 50.2 | 6.5 | 4.7 | 38.3 | 15.4 | 9.7 | 58.8 | 42.11 | 48.45 | 13.5 | 8.4 | 60.7 | 644 | 470 | 37.0 | 1,593 | 1,036 | 53.5 | 40.19 | 45.28 |
| Central | 24.6 | 16.0 | 53.8 | 3.8 | 2.6 | 46.2 | 13.6 | 9.8 | 38.8 | 28.26 | 26.53 | 15.2 | 12.0 | 26.7 | 398 | 279 | 42.7 | 1,556 | 1,073 | 45.0 | 25.60 | 26.00 |
| Frontier | 52.6 | 48.1 | 9.4 | 13.5 | 11.8 | 14.4 | 26.8 | 24.0 | 11.7 | 50.48 | 49.17 | 182.1 | 117.5 | 55.0 | 1,540 | 1,323 | 16.4 | 2,617 | 2,287 | 14.4 | 58.86 | 57.85 |
| Lake Central | 35.7 | 22.7 | 57.3 | 5.3 | 3.2 | 65.6 | 14.9 | 10.2 | 46.1 | 35.29 | 31.37 | . . . | . . . | . . . | 520 | 318 | 63.5 | 1,581 | 1,093 | 44.6 | 32.91 | 29.09 |
| Mohawk | 82.0 | 68.6 | 19.5 | 14.7 | 12.8 | 14.8 | 27.4 | 21.5 | 27.4 | 53.50 | 59.53 | 24.1 | 17.6 | 36.9 | 1,458 | 1,269 | 14.9 | 2,744 | 2,187 | 25.5 | 53.11 | 58.00 |
| N. Central | 140.1 | 90.7 | 54.5 | 22.3 | 15.8 | 41.1 | 39.6 | 33.4 | 18.6 | 56.16 | 47.31 | . . . | . . . | . . . | 2,270 | 1,609 | 41.1 | 4,537 | 3,814 | 19.0 | 50.03 | 42.19 |
| Ozark | 70.4 | 43.1 | 63.3 | 10.5 | 7.2 | 45.8 | 28.3 | 19.0 | 48.9 | 37.04 | 37.89 | . . . | . . . | . . . | 1,047 | 715 | 46.4 | 2,792 | 1,877 | 48.7 | 37.50 | 38.09 |
| Piedmont | 100.6 | 91.2 | 10.3 | 19.6 | 18.2 | 7.7 | 35.5 | 35.7 | -0.6 | 55.55 | 50.98 | 44.9 | 42.8 | 4.9 | 1,989 | 1,844 | 7.9 | 3,630 | 3,641 | -0.3 | 54.78 | 50.65 |
| Southern | 44.8 | 35.9 | 24.8 | 7.5 | 6.0 | 25.0 | 18.3 | 16.6 | 10.2 | 40.84 | 36.14 | . . . | . . . | . . . | 781 | 621 | 25.8 | 1,981 | 1,797 | 10.2 | 39.42 | 34.54 |
| Southwest | 79.8 | 60.7 | 31.5 | 15.9 | 11.5 | 38.3 | 26.2 | 19.4 | 35.1 | 39.22 | 59.28 | 27.5 | 16.4 | 67.7 | 1,579 | 1,138 | 38.8 | 2,667 | 1,973 | 35.2 | 59.18 | 57.66 |
| Trans-Texas | 41.0 | 36.5 | 12.3 | 9.3 | 8.7 | 6.9 | 23.7 | 24.5 | -3.3 | 49.55 | 35.51 | 40.2 | 36.8 | 9.2 | 978 | 919 | 6.4 | 2,705 | 2,799 | -3.4 | 36.16 | 32.83 |
| West Coast | 61.7 | 50.1 | 23.2 | 10.8 | 8.8 | 22.7 | 21.9 | 18.9 | 15.9 | 47.93 | 46.56 | 18.8 | 12.3 | 52.9 | 1,016 | 815 | 24.7 | 2,055 | 1,779 | 15.5 | 49.46 | 45.81 |
| TOTAL | 876.6 | 672.6 | 30.3 | 157.9 | 125.1 | 26.2 | 339.6 | 271.7 | 21.3 | 47.91 | 46.04 | 366.3 | 263.8 | 38.9 | 16,036 | 12,687 | 26.4 | 34,205 | 28,260 | 21.0 | 46.88 | 44.91 |

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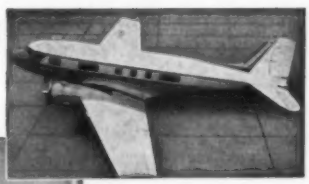

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# EN ROUTE . . .

WAYNE W. PARRISH

## How NOT to Cross the English Channel

Airplanes have been flying between London and Paris for about 25 years. The flight takes less than an hour and a half and is considered to be the customary way of traveling between the two capitals.

Wouldn't you know that an airline president would insist on making the trip by train and boat just because of a life-long dream of crossing the famous English Channel by sea and seeing the white cliffs of Dover through the rolls of spray crashing onto the boat?

Believe me, I'll die on the vine before anybody ever gets me to take that antiquated, primitive form of transport again. But I guess it was worth it—once. Anybody who says the airlines are inconvenient and encumbered with red tape has never made the channel trip.

Terry Drinkwater, president of Western Air Lines, and Stan Shatto, v.p.-operations, were adamant that they go by train and boat. So somehow we maneuvered three first-class tickets on the deluxe Fleche D'Or, or Golden Arrow, which runs from Paris to Calais and connects with the channel boat to Dover which in turn connects with an English first-class train to London.

### Air View Is Better

Not only does it cost a lot, first class, more than the airplane, but the trip knocks an entire day cockeyed. It's seven hours and 20 minutes not counting the time to and from railroad stations for a 235-mile distance. As many times as I've crossed the channel at numerous points, I'd never done it by boat and if anybody still wants to see those white cliffs of Dover I can assure you the view is a lot better from the air.

I must admit that the journey started out reasonably well. We got to the Nord station in Paris without too much trouble and managed to get a porter, although it would have been confusing if AMERICAN AVIATION's Jean-Marie Riche hadn't been along to help out. After all, I'm not accustomed to railroad stations with their weird and often baffling operations.

Sure enough, we had a deluxe first-class compartment all to ourselves, i.e., it was deluxe in the prewar days. The train started up exactly on the second at 12:25 noon and was due in Dover at 3:45. So we ordered some drinks and pretty soon the waiter began serving our lunch right in our own compartment and I said to myself, well this isn't so bad after all. The food was good. What we could see of the French countryside in the interludes between embankments and stone walls was very nice.

The first jolt I got was when the bill came around for the extras. The second jolt was when the train pulled up at the dockside. I can't remember ever seeing so much confusion and lack of organization at anytime anywhere. We had too many bags to carry ourselves, so we had to scrounge for a porter. Then we had to get in a long line to climb the single gangplank. And when we got on board, where to go?

Anybody who pays for a first-class ticket on the Golden Arrow is a first-class sucker. It's first-class until the train stops at the dock. Then you go slumming. It was a madhouse. The boat was packed. Some people took staterooms—a ridiculous thing for an hour and 20-minute boat trip. We finally located some wicker chairs on a lower deck and staked them out for our own use.

While a crowd gathered to watch I had the above caricature made in August in the Tivoli amusement park in Copenhagen. It's a Danish version of yours truly with the double chin thoughtfully subordinated.

### Red Tape Worst Feature

The worst feature of all was the constant red tape. Stan Shatto said we had to fork out tickets or papers or whatnot a total of 11 times on the trip. I would have guessed more. With your hands full of handbaggage, that's just ducky, especially when a gale is blowing and mobs of people are pressing behind and tips at every turn.

On board I found there was no currency exchange. Imagine that one for efficiency. First you needed a lot of French money for tips, then English. People were queued up all over the place but it was difficult to find out what they were lining up for. The British queue up out of habit. At one point in the trip the loudspeaker instructed everybody to pass through British immigration, which we dutifully did. At least they got that much done on board.

About the channel crossing, that was a dilly. A very stiff gale was blowing but I can't say the sea was really very rough. I stayed on top deck in one of the few dry spots, holding onto my hat and the boat. Every so often a huge wave would come over the entire top deck. A lot of people got soaked. Some were sick. Inside the ship most people had to stand or sit on their bags.

### A Grand Mess

At Dover on the English side the confusion was worse, if anything. Another porter to get the bags off the boat. No signs or directions, only a grand mess. Finally we discovered we had to go through British customs and in due course we found our bags. Then another porter to get the bags on the train. We finally found our seats.

The remainder of the journey to London, an hour and a half to Victoria station, was okay. We had some tea, the seats were comfortable, and I discovered a bar car called the Trianon in which the bar extends for half the length of the car. Poorly patronized but nicely done. The toilet on the English train was spotlessly clean.

But save me from another such trip. What I would like to know is why the French and British airlines haven't penetrated the terrific traffic market now occupied by a primitive form of train and boat combination. The British will say that the French Government (or Air France) restricts schedules. In that case, let the independents pioneer the lush market, even if it's only the 20-mile haul across the water with train connections. If the Golden Arrow is a deluxe deal, then I'm Marilyn Monroe's choice as Man of the Year. And you don't have to tell me what chance I've got for that distinction.

### Now It's O.K.

About a year ago on this page I reported on the argument in progress in Amsterdam where the sign on the Schiphol Airport tower read "Elevation 13 Feet Below Sea Level." Some of us, including Jan Gerritsen of the Fokker Company, said this just couldn't be—an elevation isn't something that's below. So now Mr. U. F. M. Dellaert, Schiphol's manager and one of the best airport men in the world, sends me a photo showing a new sign. It reads "Aerodrome level 13 feet below sea level." Thanks, Mr. Dellaert.

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